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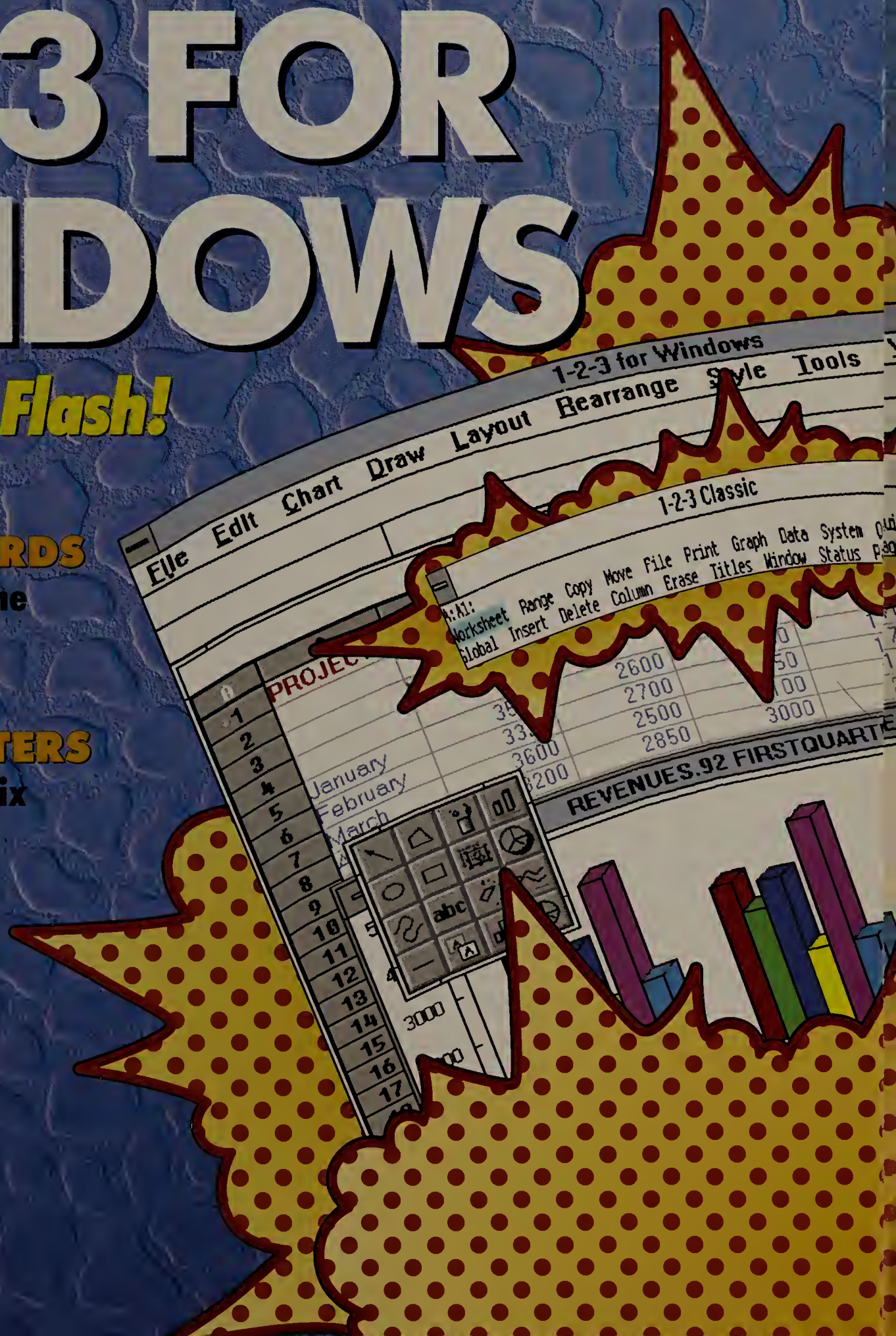

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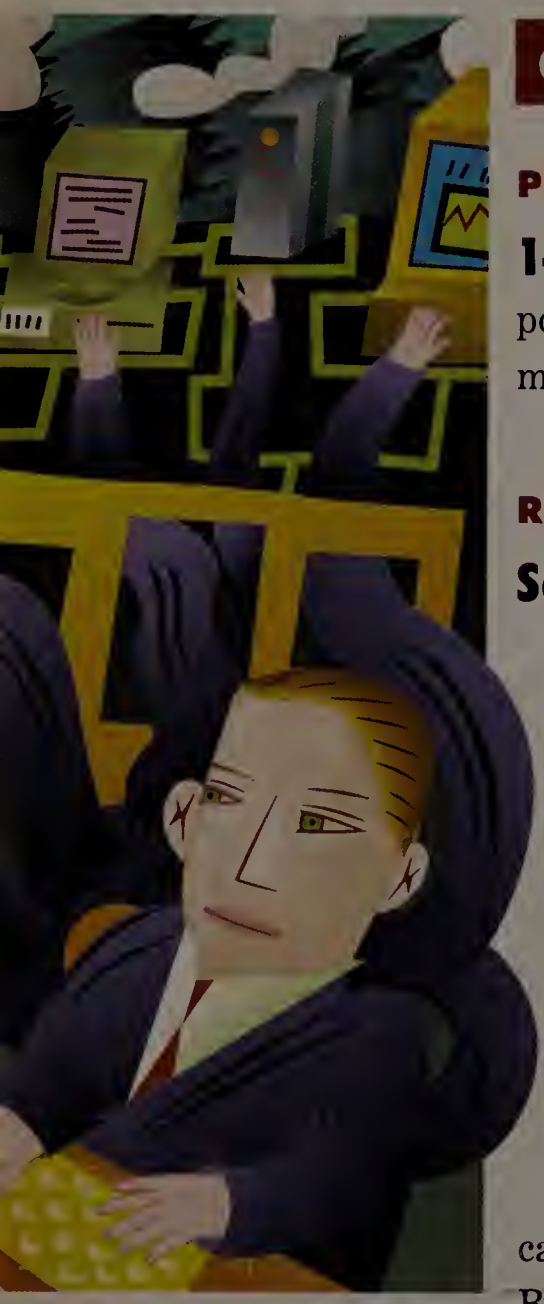

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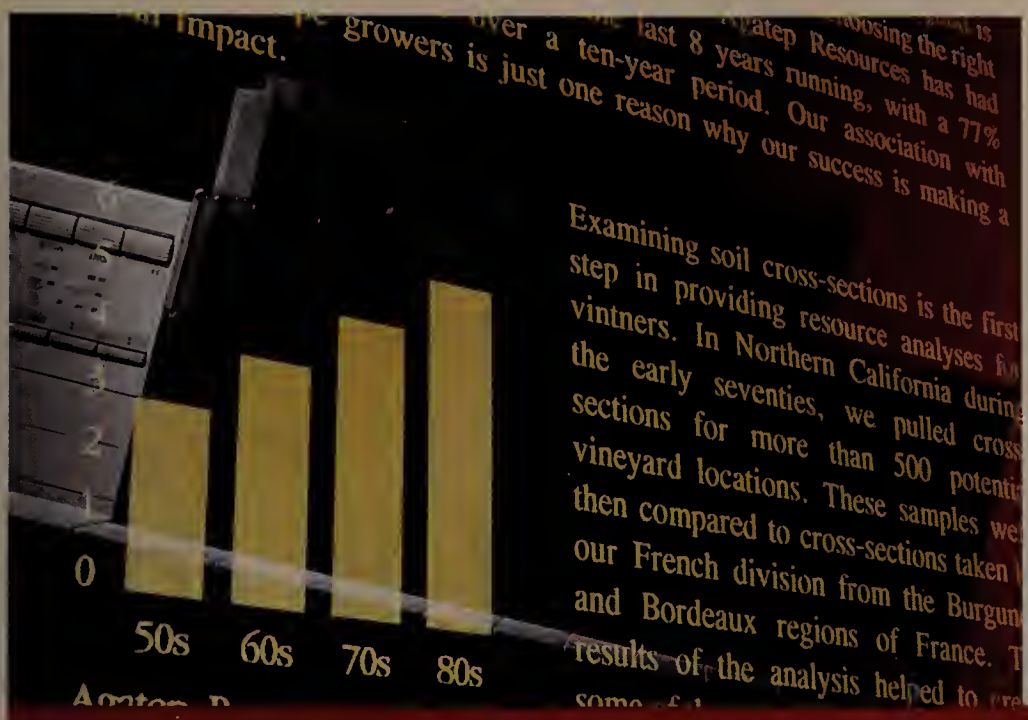

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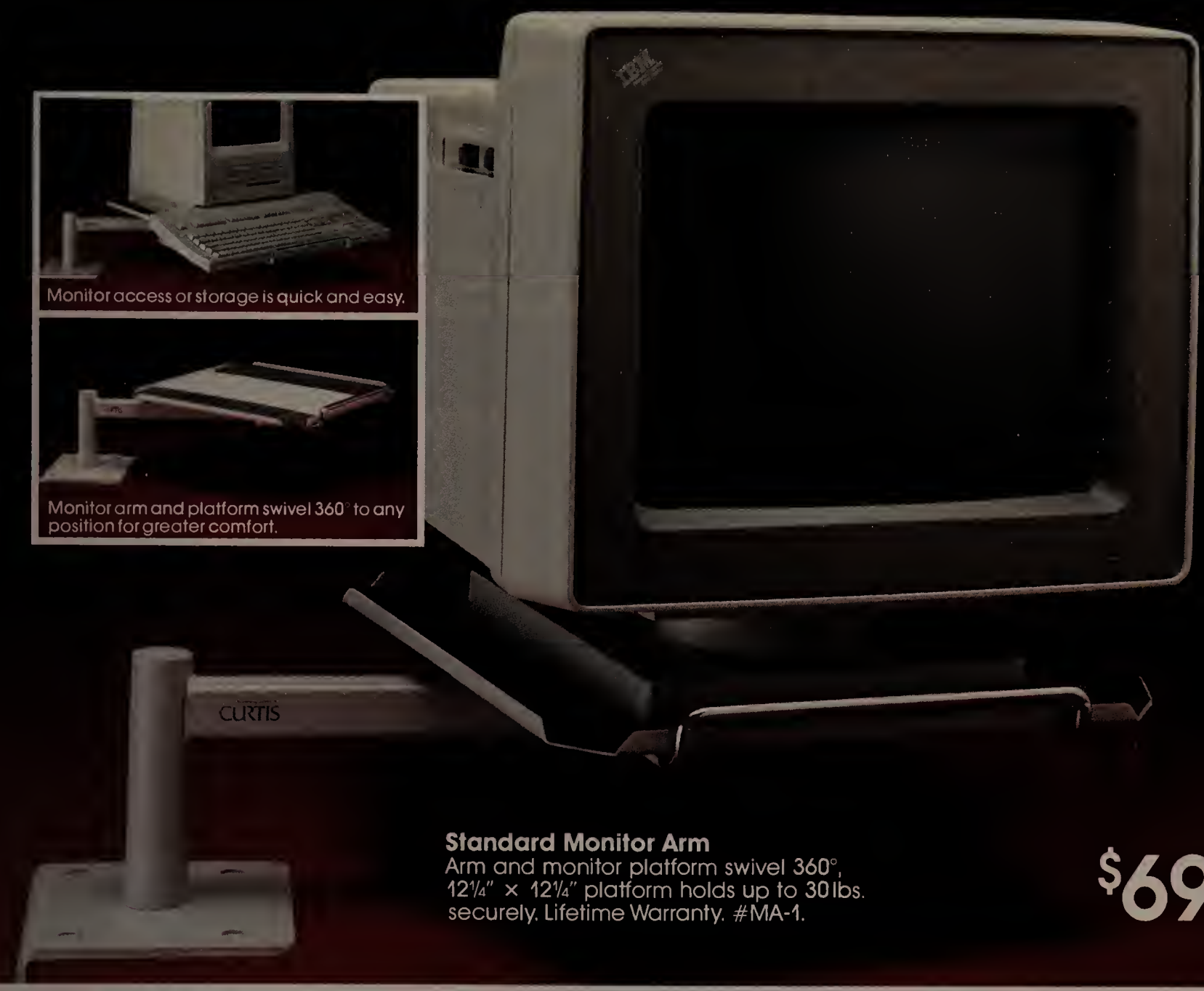

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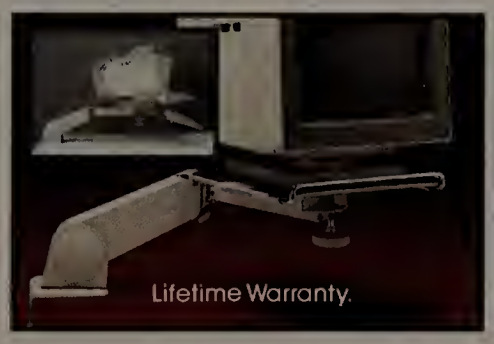

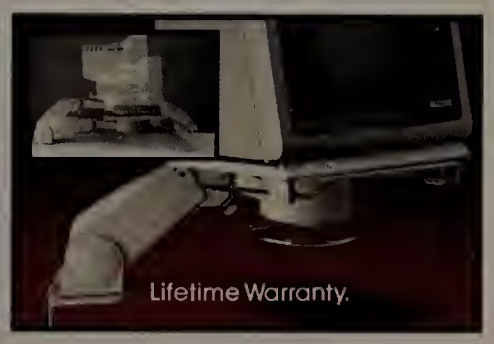

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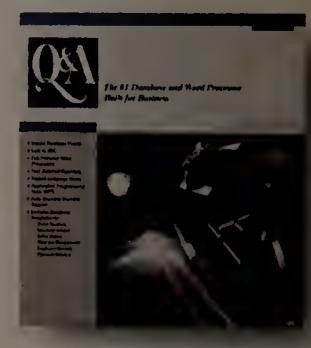

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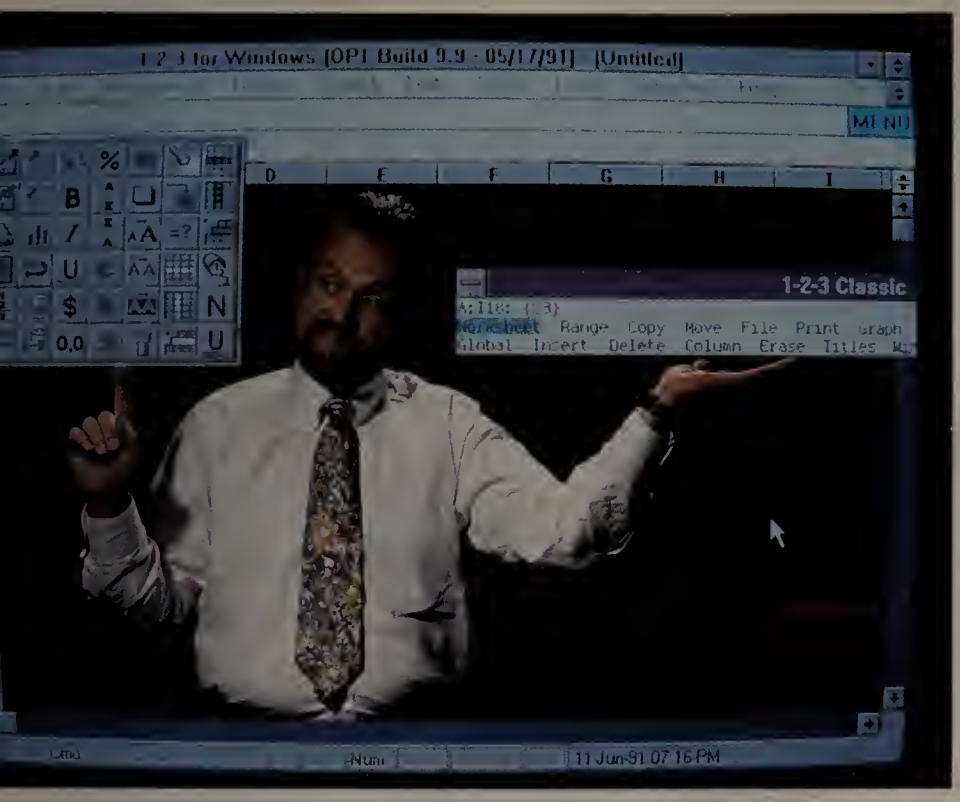


Spreadsheet columnist Richard Scoville gets the feel of 1-2-3 for Windows.

Button-Down Thinking

The greatest minds in software have done some serious cogitating. After months of research, roundtables, and overheated brain work, they've reached an earth-shaking conclusion: You'd rather push a button than pull down a menu.

Those comely, 3-D–looking buttons made their debut in *Windows 3.0*. But when they cropped up in *Excel 3.0*, we learned that buttons are more than cosmetic.

The idea is simple. For example, to pick the SUM function using *Excel 3.0*'s standard menus, you have to pull down a menu, bring up a dialog box, and scroll through a list of functions. Using *Excel 3.0*'s button-filled tool bar, one click on the SUM button is all it takes. Buttons for creating charts, drawing lines, and changing text formats also save you from needless mousing around. That's why our spreadsheet columnist, Richard Scoville, grants *Excel 3.0* "the hands-down prize for most usable spreadsheet interface."

In this month's cover story, Scoville looks at *1-2-3 for Windows* and discovers that *Excel 3.0* has some serious competition. *1-2-3 for Windows* takes the button idea a step further: You create your own panel of buttons—Lotus calls it an "icon palette"—from a selection of 70 icons, each of which calls up a program function.

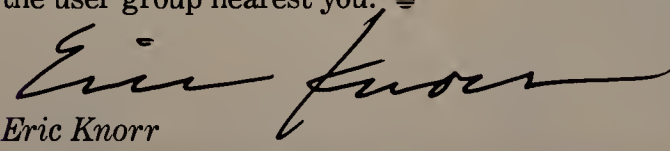
The icon palette makes *1-2-3 for Windows* one of the first programs to let you build your own user interface quickly and painlessly. If you do a lot of budgeting, you can mix in a large proportion of formula-linking and worksheet-consolidation buttons. If your job entails ad hoc analysis, you can swap in a full array of graphics buttons. Once you've created your personal palette, you can resize it and place it anywhere on screen.

Of course, buttons alone don't make an interface. Scoville maintains that *1-2-3 for Windows* can't match *Excel 3.0*'s many niceties—such as the ability to double-click on any object and have a dialog box pop up automatically. And for many *1-2-3* veterans, *1-2-3 for Windows*' old-fashioned 1-2-3 Classic menus—still available as an option—may appeal more (at least at first) than any number of mix-and-match buttons. Even so, *1-2-3 for Windows* marks a big step toward software that works the way you do. In the future, expect more *Windows* programs that take the "have it your way" approach.

This issue of *PC World* sets its own milestone in putting the user first. A new regular feature called *Road Test* gives normal folk—rather than us ivory-tower editors—the opportunity to say what they think about software and hardware. This month, on page 206, six users sound off about *Windows 3.0*.

In another move to help us all remember whose opinions matter most, we've made a small but significant addition. From now on, in all reviews and Buyers' Guides you'll find an icon next to every product that's won a World Class Award in the past two years. Each year readers vote for the top products in dozens of categories; now you'll be able to see the past winners at a glance—and take readers' recommendations into account as you decide which product will be best for you.

Finally, this month's *Consumer Watch* column presents our annual user group list. When you shop for hardware and software or need help in using the stuff you already have, there's only one way better than reading *PC World* to get the information you need—contact the user group nearest you.



Eric Knorr
Editor

WALTER CALAHAN

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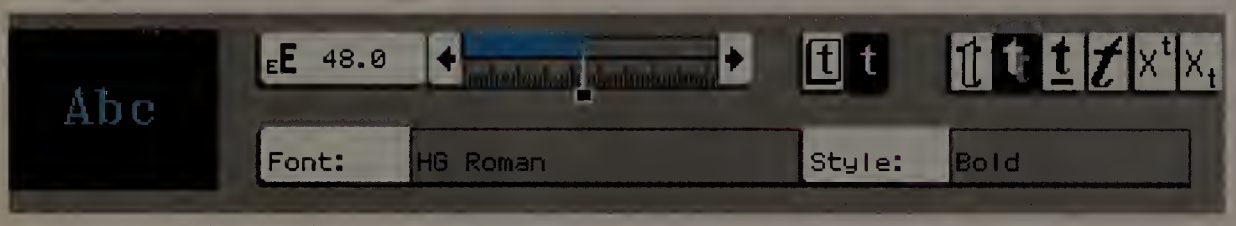

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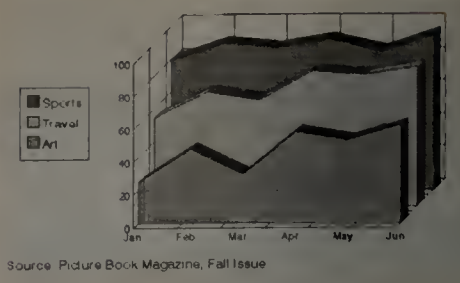
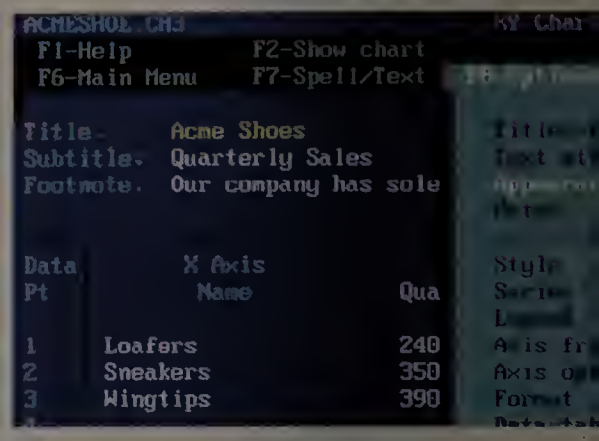


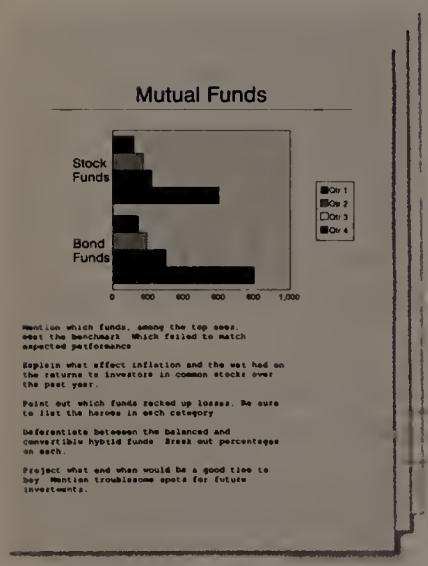
Source: Picture Book Magazine, Fall Issue

What you see is what you get.



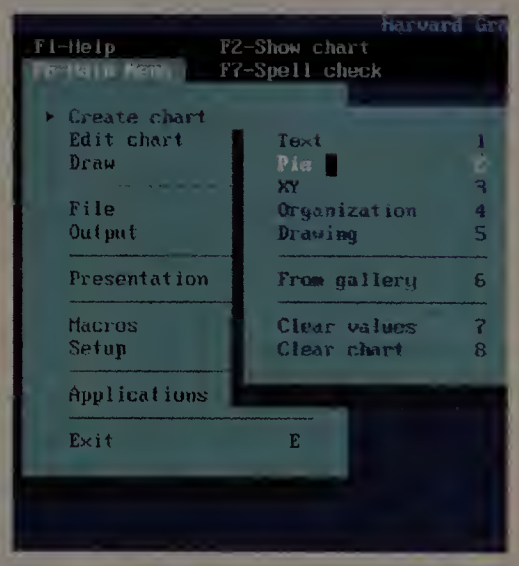
Pull-down menus: A new feature to get at the

You enter the data, we'll make it look good. It's



A reminder: We have speaker notes.

Twist it. Turn it.



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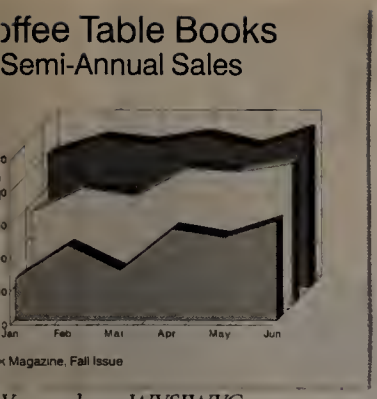
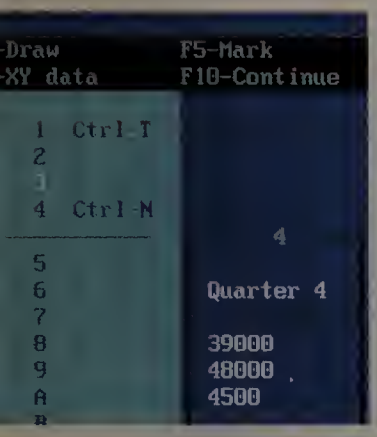


Yes, we have WYSIWYG.



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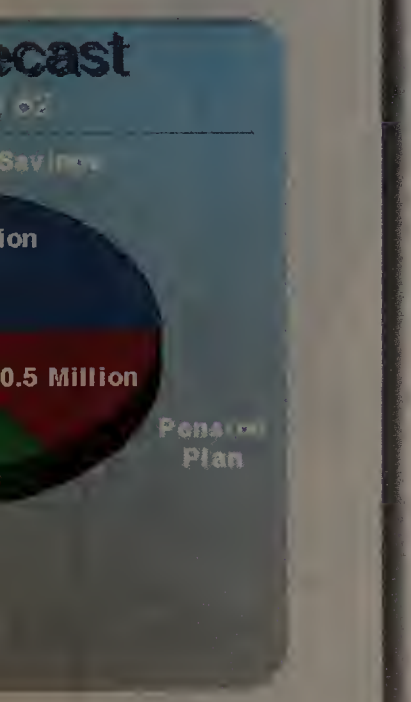

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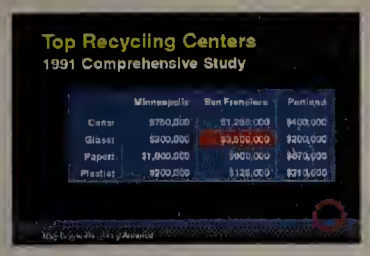

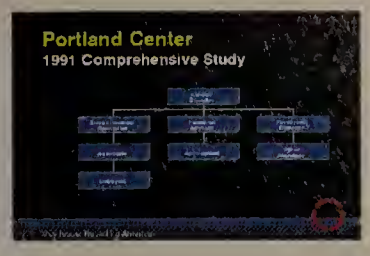

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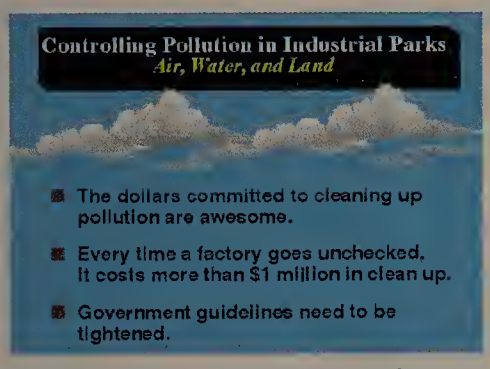

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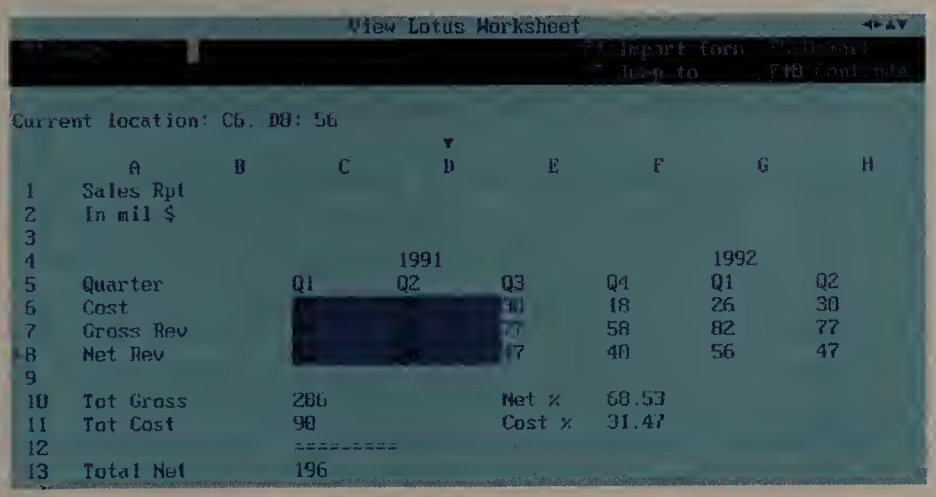

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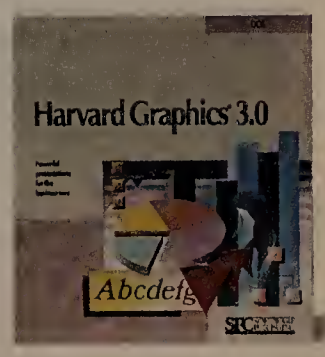

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On a normal day, Prime Time Shuttle makes 1,000 trips from four Los Angeles airports, one AMTRAK station, and the San Pablo Harbor, via LA's notorious freeway system, to homes and offices in four Southern California area counties.

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Kory Washburn is the assistant manager of Prime Time Shuttle who set up the computer system. He started December 23, 1990 with one dispatcher's computer. Now he's running 30 machines on a LANtastic Ethernet system, and expects to add a new computer to the system every week until they reach 50 nodes.

He chose LANtastic because of the flexibility of its peer-to-peer structure. "Instead of a single overloaded server, we broke down the tasks, spread them over multiple servers and still fully interconnect the system with cheapernet cable."

Washburn praises Artisoft hardware and LANtastic software compatibility with other manufacturers' cards and systems. "You can't beat the price. And the speed is incredible, especially the way we abuse the system," he confessed.

"Artisoft tech support stuck with us until they solved our problems. They were great."

There's a myth that LANtastic is only suited to small, simple systems. But next time you need a ride from LAX, remember LANtastic is the Prime Time network.

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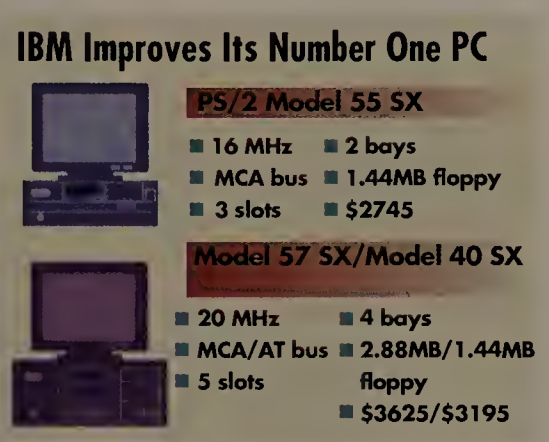
MIKE HOGAN

IBM Debuts 386SX PS/2s

AT and MCA Buses Get Equal Billing

The last major vendor to offer desktop PCs with a 20-MHz 386SX chip, IBM launched three such machines in June—including two with the AT bus that Big Blue has been trying to squelch for the past four years.



Successors to IBM's hot 55 SX are faster and more expandable and offer an MCA or AT bus.

The new Models 35 SX and 40 SX are in IBM's best-selling segment and will compete with Micro Channel architecture alternatives. Some analysts see this as a strategic retreat from the MCA bus—a suggestion IBM executives deny. AT-bus PS/2s are for personal productivity—primarily DOS applications—while MCA-based PS/2s are corporate machines suited for OS/2 networks, says David Thomas, president of IBM's National Distribution Division.

Pricing "is competitive with Compaq and within striking distance of AST and Dell," notes International Data Corporation analyst Bruce Stephen. Even the high-end MCA-based Model 57 SX provides more value than previously offered by the two-year-old 55 SX, the world's best-selling PC. For $3625, the 57 SX buyer gets more slots and more storage as well as a new 2.88MB floppy drive, 16-bit VGA, and a SCSI controller on the motherboard. A comparable AT-bus–equipped Model 40 SX will run DOS applications just as fast for $430 less, but the standard configuration has less memory, a 1.44MB floppy, and no SCSI controller. A smaller, 40MB AT-bus version, the 35 SX, lists for $2525. And memory and storage have been upgraded on the veteran $2745 Model 55.

Thomas insists that for equivalent systems, "there is no premium for the Micro Channel." Even so, IBM needs to give users a reason to choose MCA over the AT standard, analysts say. That reason could be the powerful OS/2 2.0 due this fall.

GORDON STUDER

TrueImage/TrueType Push On

Microsoft's printing business has been reorganized after the resignation of a key executive, but observers say Microsoft remains on track to deliver the TrueType on-the-fly font generator and TrueImage page description language it has promised. In fact, recent changes may hasten the advent of technology that could let users print from *Windows* up to ten times faster than from DOS-based applications, says BIS Strategies International group director Rob Auster. Although this "fast-path" printing is many months away, Microsoft is expected to eventually provide TrueImage printer vendors with display code that will greatly speed the translation of *Windows* files into TrueImage pages.

Microsoft's PostScript-cloning ambitions have been curtailed since September 1989, when it teamed up with TrueType font provider Apple Computer to compete with Adobe. Apple has since put TrueImage on the back burner, and this June Microsoft TrueImage development head Cal Bauer departed.

"But the bottom line is that we will continue to work on TrueImage," says Microsoft unit general manager Steve Shaiman, who has recast Bauer's Printer Business Unit into a *Windows* support group.

While printer vendors blame Microsoft for continued delays in TrueImage printer shipments, they add that recently released code is stable and will result in fall deliveries. TrueType font scaling has been unaffected by the delays, but this technology won't be truly useful until it's incorporated into *Windows 3.1*, due around year-end. Then on-screen display will become virtually identical to the printed page, and the stage will be set for fast-path application printing.

NCR, Grid Offer Notepad Blueprint

Jot this down: By year-end, at least half a dozen vendors will ship notepad PCs, and some analysts expect as many as 300,000 of these powerful pen-based systems to be sold in 1992. By summer's end, slate-like systems from NCR and Grid Systems will offer a blueprint of the genre.

Grid plans two 4.5-pound units running at 9.5 MHz—one with a 20MB hard drive and a 1MB RAM card slot, the other with two RAM card slots. Since hand-held devices must be even lighter than notebooks, storage capacity will be limited at first. But 40MB to 80MB drives should be common by mid-1992, and 500MB drives are envisioned for 1996.

NCR's 3125 Notepad is more representative of the size and power needed for notepads. At 3.9 pounds and with 20-MHz power, the 3125 lets you walk and do *Windows* at the same time. That's important since all entrants rely on Microsoft's *Pen Windows* and/or Go's PenPoint as the enabling platforms for compute-intensive handwriting recognition. Also, the way NCR implements Intel's low-power 386SL could yield up to 6 hours of nonstop use.

Working outside an office under varying light conditions requires at least a backlit VGA display and built-in communications. The 3125 has an optional 2400-baud modem, but expect that to be surpassed by faster offerings next year. Also, while true notepads offer character recognition, even the best boast accuracy of only 98 percent—and that's for block-letter writing. So look for keyboard options to augment notepads.

While Grid's offerings can be had for under $3600, the price tags of $4600 to $6700 on NCR's six pen-based configurations are more representative. That may seem pricey, but NCR estimates there are some 20 million potential notepad users.

Microsoft Ups Support

Admitting that Microsoft's resources were overwhelmed by the surge of *Windows* users, Chairman Bill Gates promises to expand *Windows* tech support through staff increases, road shows, and software enhancements.

Surge in Windows support calls has Microsoft spending millions to improve its response.

After years of lukewarm *Windows* sales, 4 million copies of *Windows 3.0* were sold during the year following its May 1990 debut. *Windows* application sales tripled to $400 million even though DOS-based leaders weren't yet rewritten for the environment.

Microsoft doubled tech staff to 600 to meet all the support calls—many for simple installation problems.

"Virtually all of these are avoidable," asserts Gates, who figures better developer tools and "literally thousands of improvements" in *Windows 3.1* will cut the initial load in half when *3.1* ships around year-end. A new $14.95 *Windows Resource Kit* offers a variety of utilities and tips on how to avoid the most common *Windows* problems.

But general manager of product support Patty Stonesifer expects new titles such as *1-2-3 for Windows* and *WordPerfect for Windows* to keep help requests high. She promises to double end-user tech staff again if necessary and increase the number of developer and corporate support coordinators to whatever level is needed.

Stonesifer claims Microsoft has reduced the phone wait to under a minute for 85 percent of callers, but Gates insists all calls be answered in less than a minute. Bill Lodge, corporate systems analyst for New York City's Turner Construction, says he no longer experiences the 10-minute waits of last spring, but "they still have a little ways to go."

Microsoft also plans a series of technical seminars throughout the nation and is examining ways to leverage the support efforts of other *Windows* vendors. These programs cost millions of dollars, says Stonesifer, but cost isn't a showstopper since *Windows* revenues are increasing faster than the phone calls.

IBM Sets Superfloppy Standard

IBM's long-awaited announcement of a floppy disk drive with 2.88MB of usable capacity virtually guarantees that the "superfloppy" will become the next media standard, say observers. Backwardly compatible with lower-capacity 3½-inch drives, superfloppies should appear at least as options on numerous PCs by COMDEX Fall and on nearly all PCs by early next year.

IBM had hoped to introduce the drive last year but waited for the June shipment of DOS 5.0, which recognizes the format without other drivers. Drive and media makers have long been tooled up and ready to supply the 580,000 drives Jim Porter, president of Disk/Trend, estimates the market will need this year, as well as the 1.2 million he predicts will ship in 1992.

By 1993 the 2.88MB capacity will constitute 7 percent of the 35 million microfloppy drives shipping—a relatively quick penetration. While the 3½-inch microfloppy was introduced in 1982, it wasn't until 1987 that IBM chose that form factor over other options. Microfloppy shipments passed 5¼-inch drive shipments a year later.

Porter anticipates an initial price premium of $15 to PC makers and $25 to end users, relegating the 2.88MB format first to high-end machines. But since it costs only $3 more to make a 2.88MB drive, the premium will be short-lived, predicts Gene Dougherty, director of sales and marketing at Toshiba America's media and recording division, which holds the primary patents on the 2.88MB recording technique and its barium-ferrite media (disks will cost $10).

Despite talk of PC makers leaping to 20MB-plus floppies, IBM's decision and higher costs will relegate higher-density drives to backup duties for a while, says Porter.

GORDON STUDER

50-MHz 486 Lines Up Against RISC

The 50-MHz version of Intel's 486 chip—the next plateau for PC power users and a major weapon in Intel's struggle against Reduced Instruction Set Computer (RISC) chips—has arrived. Well, almost. While both chip and systems based on it debuted in June, Intel won't deliver the 486/50 in quantity until the fourth quarter.

Like its slower compadres, the 486/50 is a high-powered 386 superset with 8K of cache and an integrated math coprocessor. It is priced fairly aggressively at $665, considering that a 486/33 costs manufacturers $445.

As it did with the 486/25, IBM became the first vendor to unveil a product based on the new chip: a processor swap-out for XP models that should boost system prices past $15,000. By ship time, expect just as many 50-MHz PCs from Compaq, Dell, and others. All will carry a hefty price premium and appeal initially to a small handful of users running client-server network applications, CAD packages, and other CPU-hungry software.

That means Intel is throwing its new champion up against the RISC onslaught, notes Computer Intelligence analyst Dan Ness. In fact, the 486/50 beats the market-leading Sparcstation 2 in some benchmarks and "will be very competitive against all comers," promises Intel marketing manager Tim Keating.

Intel "has been able to keep up with RISC processors in integer performance, but it's somewhat behind in floating-point," notes Michael Slater, editor of the *Microprocessor Report*. He expects RISC chips shipping later this year to be significantly faster and predicts Intel's next play in this power game will be the 586 rather than a faster 486.

While most 486 machines remain specialty items, Keating points out that a million have shipped to date, and Intel expects to double that by year-end. But most new sales will be of relatively inexpensive 486SX PCs, says market researcher Instat, which predicts shipments of only 10,000 486/50 PCs this year. ●

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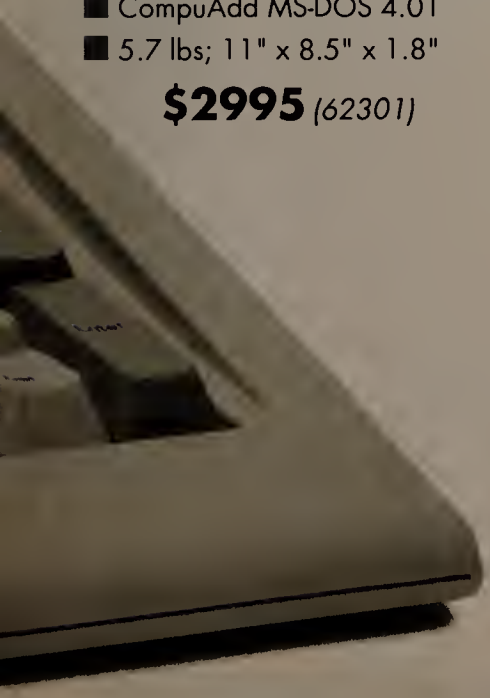

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RICHARD LANDRY

JOCK MCDONALD

Why IBM and Apple Should Be Friends

A marriage of the two PC giants would be more natural than you'd think.

PC journalists had a field day recently over news that IBM and Apple were holding peace talks. Predictably, officials from both companies said little about the subject, but just one whiff of those discussions was enough to set keyboards clattering everywhere—including here at *PC World.*

As crazy as it sounds, Apple and IBM are discovering plenty of reasons to cooperate. Both PC titans are in the throes of major crises. IBM is losing ground to less expensive, high-power clones. Apple is gaining users but losing profits with its new, low-price product line. Both companies are feeling the heat from workstation heavyweight Sun Microsystems. And both are plenty worried about mutual archrival Microsoft and its smash hit, *Windows.*

But shared worries alone don't make a relationship. Apple and IBM actually have a great deal of PC innovation to offer one another, and their combined technologies could set the pace in emerging areas such as pen-based PCs, multimedia, and graphical workstations. Most of all, an alliance between Apple and IBM could add a new element of choice to the PC arena, furnishing perhaps the only credible alternative to the Bill Gates *Windows* strategy now on the horizon.

New Software for New PCs

To get out of their rut, Apple and IBM need to sell more PCs—lots of them. But industry standards—DOS, and now *Windows*—have made it virtually impossible for either vendor to lock up the majority of PC purchases. So together IBM and Apple are heading toward areas where *Windows* hasn't yet taken root. In pen-based PCs, for example, the behemoths appear to be lining up behind Go Corporation's PenPoint operating system, versus Microsoft's *Pen Windows* or a special pen version of the Mac system software. Since PenPoint features a more advanced, easier-to-use interface than either *Windows* or the Mac, it may prove a meeting ground for software that unites the companies' desktop PCs, too.

In multimedia, both Apple and IBM are feeling enormous pressure from a Microsoft-led coalition of hardware vendors who have agreed to build *Windows*-compatible multimedia PCs and peripherals. Many believe that PCs capable of juggling sound, animation, and video stand a good chance of ushering in a new era in home computing—just the ticket to revive IBM's and Apple's profits. Moreover, multimedia can merge with networking to spawn new kinds of business applications—integrated voice mail and E-mail, for example. Tandy, AT&T, NEC, Philips, and Zenith have already thrown their weight behind multimedia *Windows,* so Apple and IBM may find cooperation necessary for sheer survival.

The hardware giants face an even more severe challenge on the workstation front. Low-price workstations like Sun's represent the future of office desktop PCs—graphical, fully networkable, capable of integrating information from throughout an organization. So far, Microsoft has succeeded in uniting a consortium of far-flung competitors like Compaq and DEC behind a standard based on a future version of *Windows* that supports high-speed RISC chip technology. With OS/2 and its own RISC chips to promote, IBM desperately needs a hardware partner. With a version of the Mac operating system for RISC systems, Apple may find a willing collaborator in IBM.

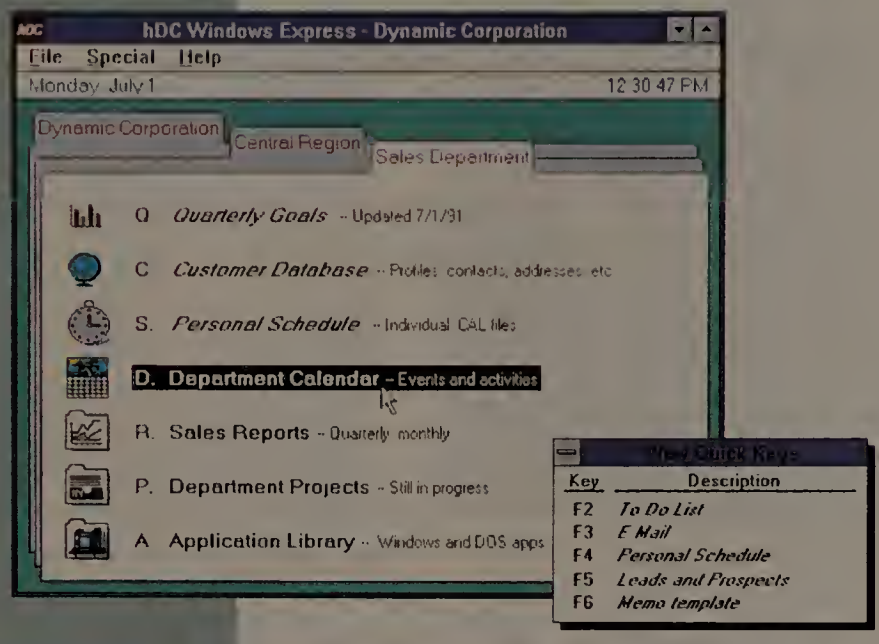
Elsewhere, Apple and IBM may be able to exploit Microsoft's weaknesses to their advantage. It's no secret, for example, that *LAN Manager* has been a failure compared to Novell's NetWare or even Apple's own *AppleTalk.* IBM has tied the knot with Novell but could still use some help to network PCs in small organizations that don't need the power or the hassle of NetWare. With a broad, integrated product line, IBM, Apple, and Novell would form an invincible networking bloc.

The Payoff: A Bigger Marketplace

In contrast with the wild-and-woolly days of the first PC clones, this new era of cooperation between industry giants

(continues)

Take the Express route to Windows Standardization.



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PC MAGAZINE FEBRUARY 1991
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Circle 106 on reader service card

RICHARD LANDRY

might strike some as a step backward. Why encourage technology leaders to square off against each other in groups of twos and threes when it seems better all around for them to agree on hardware and software standards?

The answer's pretty clear. At more than 60 million units installed and growing, the PC world is big enough to handle some diversity. Multimedia and pen computing represent new opportunities for simpler, more powerful PCs. Workstation technology can breed a class of high-performance desktops capable of handling tasks we can only imagine. Nobody wants to stifle such developments with outdated or inappropriate standards. But with such boundless possibilities, it will take powerful software glue to hold all the pieces together—and a few determined companies that can make their promises stick.

As always, I'm interested in your opinions on this or any other subject. Write to me at *PC World*, 501 Second St. #600, San Francisco, CA 94107; fax 415/442-1891; MCI Mail Richard Landry/301-3685. ●

POWER TIP NO. 200

Losing Your Changes With 1-2-3 2.2

If you try to quit *1-2-3 2.2* with unsaved changes in your worksheet, the program alerts you—but don't let this seeming safety net lull you into a false sense of security. You can still load a new file over your current worksheet and lose all your changes without a peep from *1-2-3*. So use good work habits and save frequently. Then even if you have an accident, it probably won't be a disaster.

Rex Farrance
Assistant Editor

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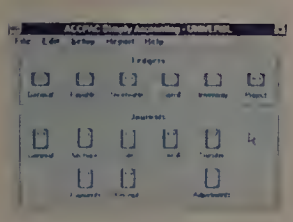

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dFacts Are In.

DATABASE COMPARISON TABLE	dBASE IV version 1.1	Paradox version 3.5	FoxPro version 1.02
EASE OF USE			
Control Center organizes data, queries, forms, reports, labels, applications on one screen	Yes	No	No
Create applications *without programming*	Yes	Yes	No
Modern pulldown menus for all Design Tools	Yes	No	Limited
Query by Example (QBE) for easy access to information	Yes	Yes	No
Context specific help by menu item	Yes	No	No
PRODUCTIVITY			
Quick Layout for automatic forms, reports and labels	Yes	No	Yes
Application Generator for quick application development	Yes	Yes	No
Automatic code generation for all Design Tools	Yes	No	No
Automatic maintenance of multiple indexes for ordering data	Yes	No	No
Memo fields for notes, letters, descriptions	Yes	No	Yes
POWER & FLEXIBILITY			
Bold, underline, italic, subscript, superscript text for high impact reports and labels	Yes	No	No
User Defined Functions for extending programming language	Yes	No	Yes
Data input validity checking in forms	Yes	Yes	Yes
Multi-user transaction processing ensures data integrity	Yes	No	No
Number of file formats imported/exported	7	6	3
INDUSTRY STANDARDS			
#1 Selling, #1 Rated multiuser database; over 3 million users (1)(2)	Yes	No	No
Compatible with dBASE III PLUS data and applications	Yes	No	Yes
Compatible versions for DOS, VAX VMS, Macintosh, SunOS and other UNIX platforms (3)	Yes	No	Limited
Structured Query Language (SQL) integrated with programming language	Yes	No	No

(1) dBASE III PLUS and dBASE IV comprise approximately 55% of PC database systems sold (3 times nearest competitor) according to the most recent report by the market research firm Audits & Surveys (Oct. 1990) (2) Software Digest rated dBASE IV #1 among multiuser databases, October 1990 (3) Versions of dBASE IV are shipping for DOS, VAX, and SunOS. Macintosh and other UNIX Platforms are announced.

Based on what our customers tell us, we made a list of some of the most important features to look for in data management software.

Then we compared the new dBASE IV® version 1.1 with two other database products.

As you can see, dBASE IV offers exclusive advantages in many categories.

For instance, only dBASE IV lets you access all its functions from a single screen. Called the Control Center, this screen lets you manage existing data, and create new tables, queries, reports, forms and labels totally without programming.

When all the facts are on the table, it's easy to see which database software is best.

Of course we aren't the only ones who have come to this particular conclusion.

Software Digest rates dBASE IV version 1.1 the #1 Multiuser Database (Vol. 7, No. 13, Oct. '90).

Trademark/owner: dBASE IV, Ashton-Tate, Ashton-Tate logo/Ashton-Tate Corp. Other company or product names mentioned may be

dTruth Comes Out.

Software Digest® RATINGS REPORT®

The Independent Comparative Ratings Report for Selecting IBM PC Business Software

Volume 7, Number 13

MULTIUSER DATABASE PROGRAMS

Ratings Key: ■ 7.0–10.0 ■ 5.0–6.9 ■ under 5.0

Software Digest Rating	Overall Evaluation	Overall Power	Program Name	Version Tested	Performance	Versatility	Error Handling	Ease of Learning	Ease of Use	Memory Requirement	Price	Volume Purchase Agreements	Page
★★★	7.0	6.7	dBase IV	1.1	■	■	■	■	■	450KB	$795	✓	28
★★	6.8	5.1	Paradox	3.5	■	■	■	■	■	640KB	$995	✓	32
★★	6.8	7.1	FoxPro/LAN	1.02	■	■	■	■	■	512KB	$1,095	✓	30
★★	6.4	5.1	DataEase	4.2	■	■	■	■	■	640KB	$750	✓	26
★	5.8	3.6	R:Base	3.0	■	■	■	■	■	520KB	$995	✓	34
★	5.7	6.0	Clarion Professional Developer	2.1	■	■	■	■	■	512KB	$845	✓	24
★	5.7	6.6	Advanced Revelation	2.01	■	■	■	■	■	640KB	$995	✓	22

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Perhaps the most independent publication in the industry, *Software Digest* accepts no advertising whatsoever. Corporations pay hundreds of dollars a year to receive their monthly reviews—which are considered highly unbiased and objective. Their exhaustive, 75-page report concludes:

"Among the top ranking programs, dBASE IV (version 1.1) is the most well-rounded, with solid performance, versatility, and usability." Commenting on speed, *Software Digest* points out that "dBASE IV produces all three test reports as fast as or faster than FoxPro/LAN." As for Ease of Use and Ease of Learning, dBASE IV scored in the Excellent Range as many times as any other multiuser database product tested.

For a free evaluation kit, including competitive details and a free demo disk, call toll-free: 1-800-437-4329 ext. 1416. Better yet, call 1-800-2ASHTON to upgrade to the new dBASE IV now.

The truth is, no other database can do so much to improve productivity.

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LETTERS

Reactions and responses from the PC World community

MARY LYNN BLATSUTTA

ANTHONY RUSSO

Charity Begins at Home

Richard Landry's May column ["Multimedia: What's It Good For?"], with its suggestion to send our obsolete computers to Eastern European students, compels me to ask a question: Why do we need to look outside our own country for a good cause? I don't want to sound like an isolationist—I applaud the idea of helping Eastern Europeans. Still, there are plenty of students right here who'd benefit from having a PC or two in school. Perhaps then they'd be able to learn enough for us to stay educationally equal with the rest of the world.

Albert M. Halowell
Pittsburgh, Pennsylvania

Hats off to IDG—*PC World*'s parent company—for its commendable effort to place old PCs in Eastern Europe. We should also promote similar programs closer to home, but we can't ignore the benefit in opening up this part of the world to PCs.

David J. Grein
Rochester Hills, Michigan

Charity begins at home. Local schools, United Way organizations, branches of national health organizations, and any number of other deserving institutions would be thrilled to receive those castoff computers. There's nothing wrong with helping Eastern Europeans. Let's be sure we're not overlooking the needy who are right under our noses.

Rick Fischer
Memphis, Tennessee

The flood of letters we received on this issue reflects your commitment to helping those in need, here and abroad. Although we couldn't find a nationwide domestic institution to match IDG's East-West Education Development Foundation, excellent programs operate at the state and local level. For example, Computers and You, a nonprofit organization founded in 1988 by PC World Communications' then–corporate chairman David Bunnell and IDG, is based in San Francisco and offers computer training and education to homeless children and their parents. PC World, *with the blessing of the Software Publishers Association, donates demonstration software to CompuMentor, a Northern California group that distributes software to nonprofit groups. Educators tell us they welcome any help they can get. So if you want to help your community and don't have a program in mind, your favorite school or community college is a great destination for computers and other PC equipment you no longer use.*
—Richard Landry

Are Dell Ads Unfair?

I'm fed up with the Dell Computer ads I see every month in your magazine. Dell says you can have their computers for much lower prices than Compaq's and get better service too. But when you compare Compaq's actual street prices with Dell's, the differences are less than the ads indicate. Anyone who's been in the computer business as long as I have knows that Compaq stands behind its machines. If a user is ever unhappy with service, nine times out of ten it's the fault of the dealer. Compaq machines are technically superior. They outperform and outlast most brands, and the price difference is worth it.

Ray Parton
Seattle, Washington

Two-Fisted Fan

I'm a fan of Mark Marek's *Two-Fisted Management.* Arnold Harris's antics give adults in the corporate world an opportunity to laugh about all-too-familiar situations. In addition, the cartoon serves as an aid in developing the proper attitude for survival in hostile business environments. So don't even think about messing around with the strip, or I'll have your jobs!

Loras J. Holmberg
Plymouth, Minnesota

Boarding the EISA Bus

After reading your April review "33-MHz 386s: Survival of the Fastest," I wonder why you don't give more atten-

(continues)

tion to the Extended Industry Standard Architecture bus. Is it because all the system and applications software so far available doesn't take advantage of its 32-bit potential? Or is it because you aren't yet seeing any EISA boards that outperform 16-bit AT boards?

Everett Wallace
Los Angeles, California

Current operating systems, programs, and EISA boards can take full advantage of the EISA bus's ability to drive 32-bit peripherals. But only a demanding application, such as a high-performance server or graphics workstation, generates enough input/output demand to overtax a conventional 16-bit bus. Even though few single users can benefit from EISA today, as I/O demands increase and production costs come down, you'll find more EISA systems on the desktop. —Ed.

Unabashed Mac-Bashing

I'm tired of reading PC-bashing letters, like the one from Carleton Sarver in May, that draw unfavorable comparisons between PCs with *Windows* and the Mac. The Mac's operating system is awkward and silly, and as far as icons go, who cares? Glitter is nice, but performance is essential. And if you buy an affordable Mac, you're stuck with a black-and-white TV in a shoe box.

Brett Williams
Austin, Texas

MoneyCounts to This Reader

I was amazed by your low rating of the easy-to-use *MoneyCounts 6.5* in April ["More Profits From Personal Finance"]. With just the basic *MoneyCounts* program, I was able to reconfigure my church's accounting system, which included about 175 accounts and subaccounts. Frankly, I appreciate that I don't have to pay for extras like the *CheckFree* payment service unless I want them. But if I add in every option Parsons Technology offers, I still wind up with a nicely integrated package that's less expensive than *Managing Your Money 7.0.*

Matt Gatchell
Cedarburg, Wisconsin

Taking the Bull by the Horns

Your review of *Corel Draw 2.0* in May's Windows Special Report peddles some pure bull! Terrific as Best Buy *Corel Draw* is, it doesn't convert its fonts to Adobe Type 1 format. A bug in the WFNBOSS conversion utility prevents a clean conversion, as your *Bug Watch* in the same issue indicates. This kind of error makes me wonder why *PC World* isn't verifying all the functions of the products it reviews.

Jim Long
Ellington, Connecticut

(continues)

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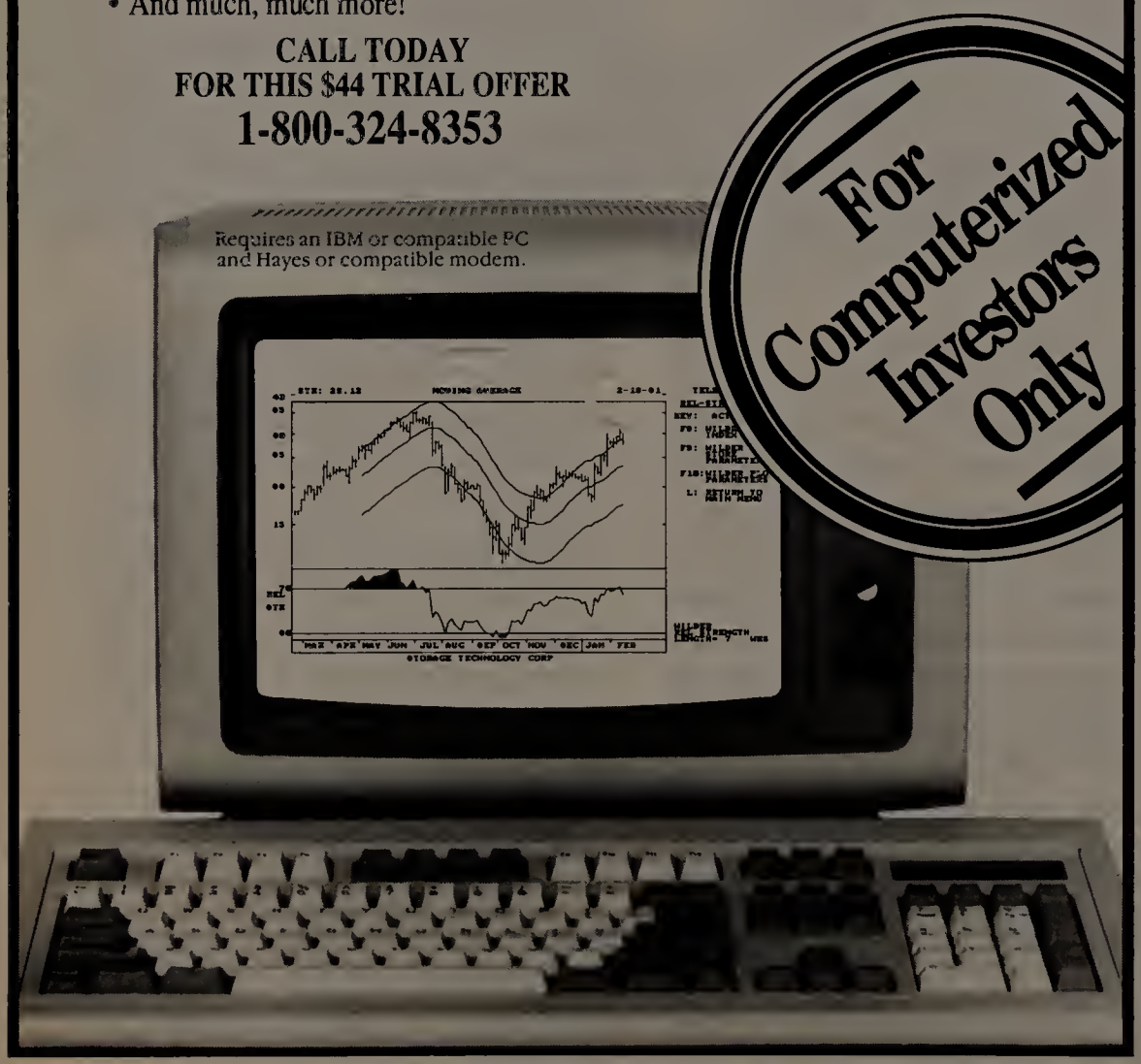

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Circle 69 on reader service card

When we tested Corel Draw 2.0, *we didn't encounter the problem Mr. Long mentions. According to Corel Systems, this malfunction doesn't occur with all conversions—but the company assures us that they expect to ship a fix before you read this. We apologize for letting this bug get through our net, and we've taken steps to ensure that from now on the information in our new* Bug Watch *is given to all review editors before press time. —Ed.*

Communications Dispute

We appreciate the Best Buy you gave our communications package *Procomm Plus 2.0* in April ["Easier Tools for the On-Line World"]. But I was disturbed at your charge of faulty DEC terminal emulations; we've always considered them among *Procomm Plus*'s strongest features. Author Judy Heim's vague criticisms of backspace and function key behavior are particularly surprising, considering that users can remap the keys to fit their needs. I have no record of *PC World* calling our technical support to discuss these problems, and I suspect they relate to user settings rather than any bug in the program.

Phil James
Datastorm Technologies
Columbia, Missouri

I tested the DEC emulations on each program using the default settings. I called a VAX and ran a variety of editors and data base software. Procomm Plus 2.0 *was the only package that displayed backspace and function key problems. With backspace in destructive mode, for example, characters I erased disappeared from the screen but remained in the edited file. And none of the function keys worked properly in VT220 emulation: While connected to a VAX running Ingres'* ISQL *terminal monitor, I couldn't even execute a command. I apologize for my oversight in not discussing these problems with Datastorm's technical support. But users shouldn't have to remap keys to achieve adequate terminal emulations. —Judy Heim*

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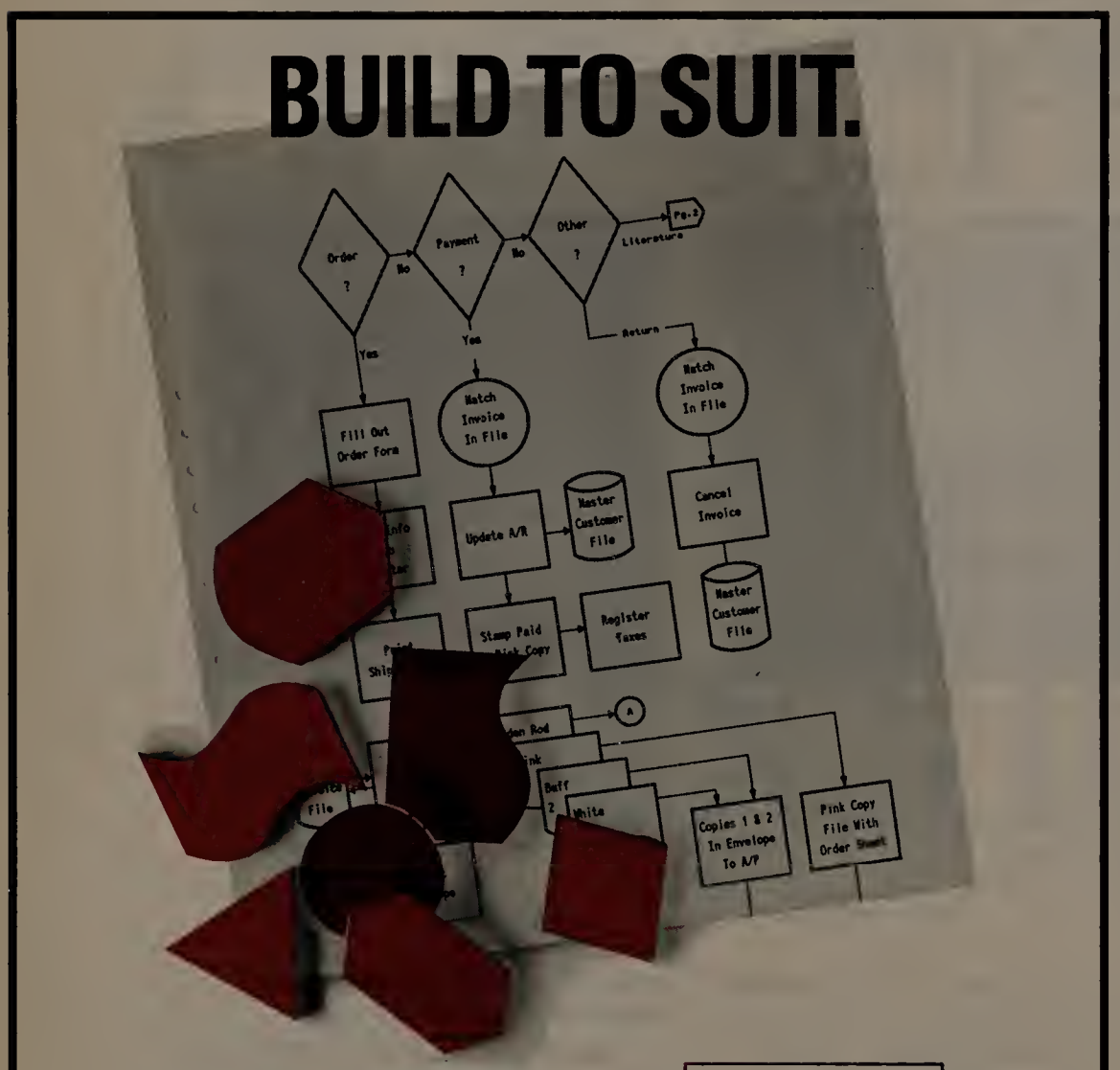

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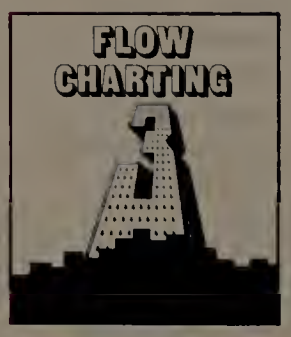

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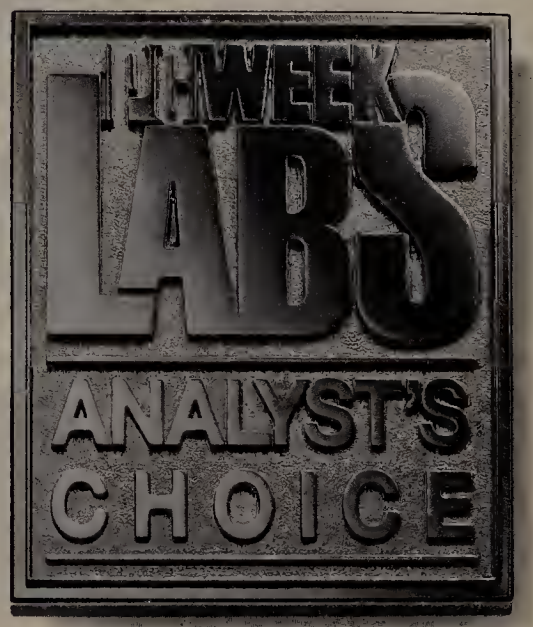
PC Magazine, December 11, 1990

PC World, May 1990

InfoWorld: Product of the Year, February 4, 1991

Byte, January 1991

InfoWorld: Buyers Assurance, January 7, 1991



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POWER TIP NO. 193

Avoiding Conflicts With Tiffany

If you need to take a *Windows* screen shot with *Tiffany,* but *Tiffany* conflicts with the application you're running, use *Windows'* built-in screen dump feature. Press <**Print Screen**> to capture the entire screen to the *Windows* Clipboard or <**Alt**>-<**Print Screen**> to capture the active window. Open the Clipboard, and save the image to disk as a CLP file. As there's no utility that reads CLP files, load *Tiffany* (set to save images in color PCX format), load the Clipboard, and maximize it to full screen. Then load the CLP file, and press <**F11**> to save the image as a PCX file. Unfortunately, you'll also get the Clipboard's menu bar. To do away with it, load the PCX file into *Windows' Paintbrush* and just wipe out the menu bar. Voilà—you have a screen shot.

Robert Luhn
Senior Editor

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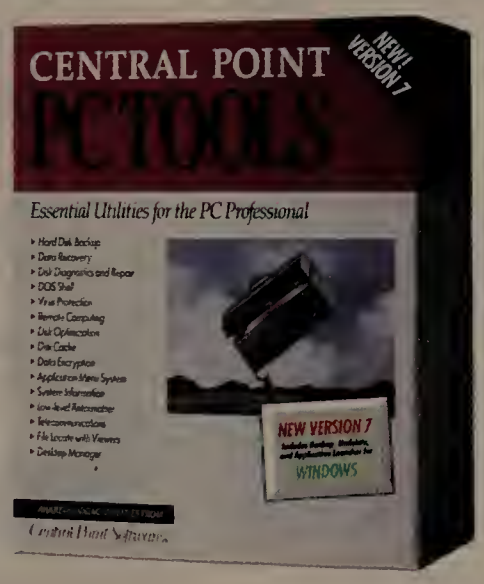

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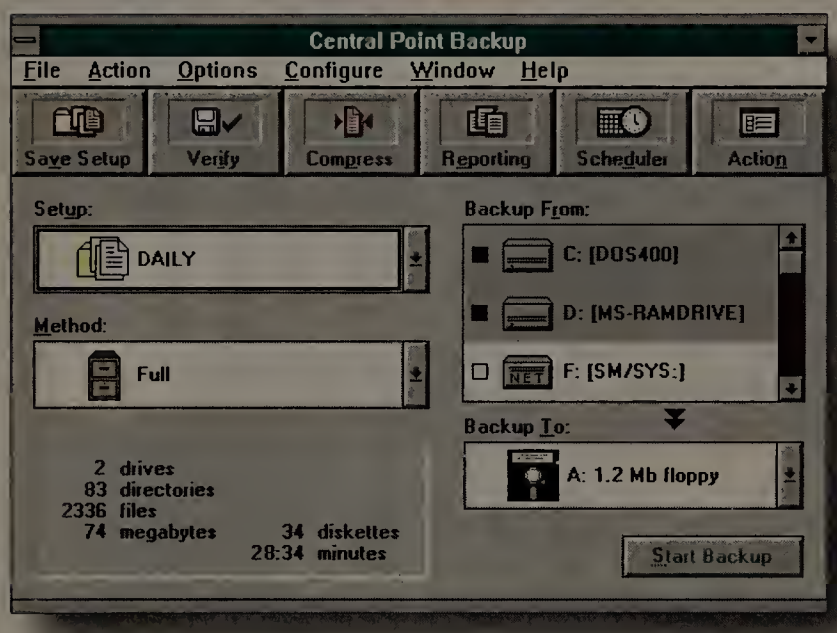

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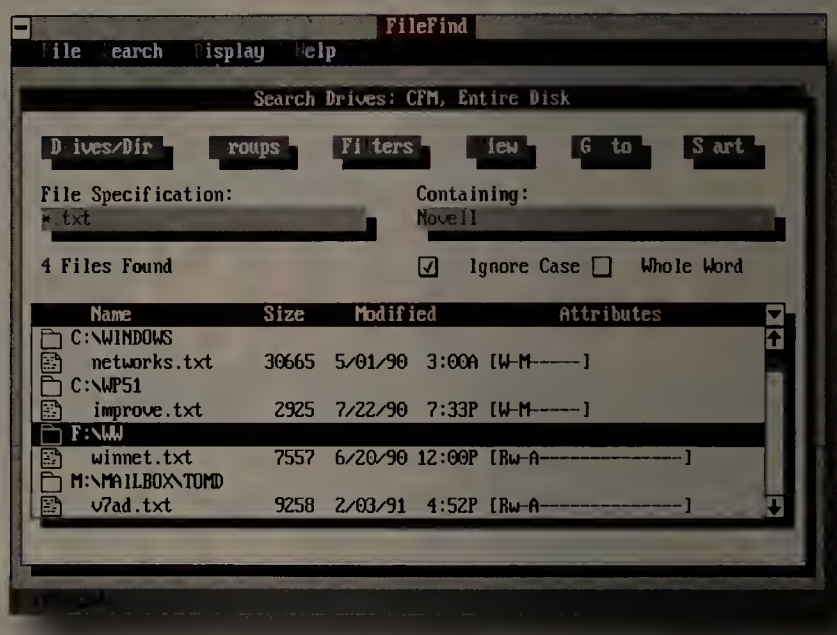

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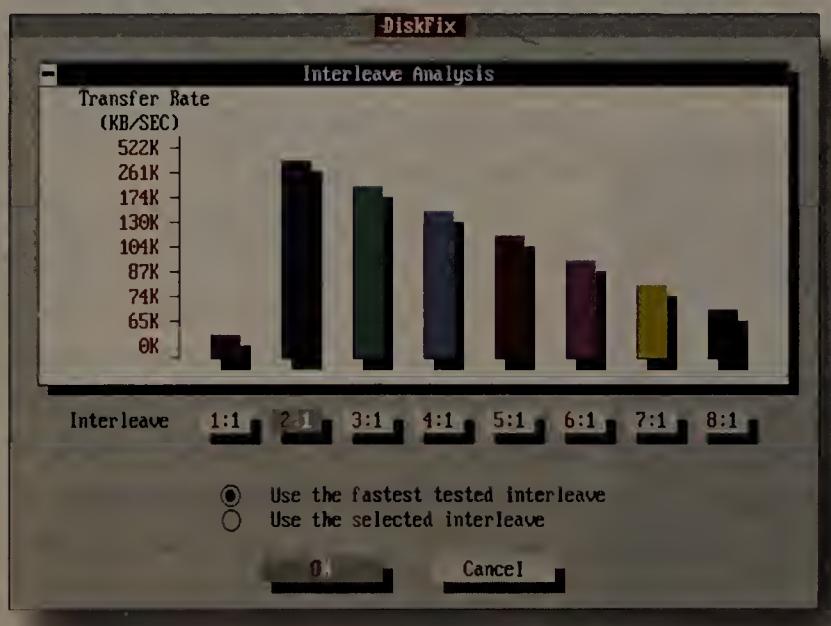

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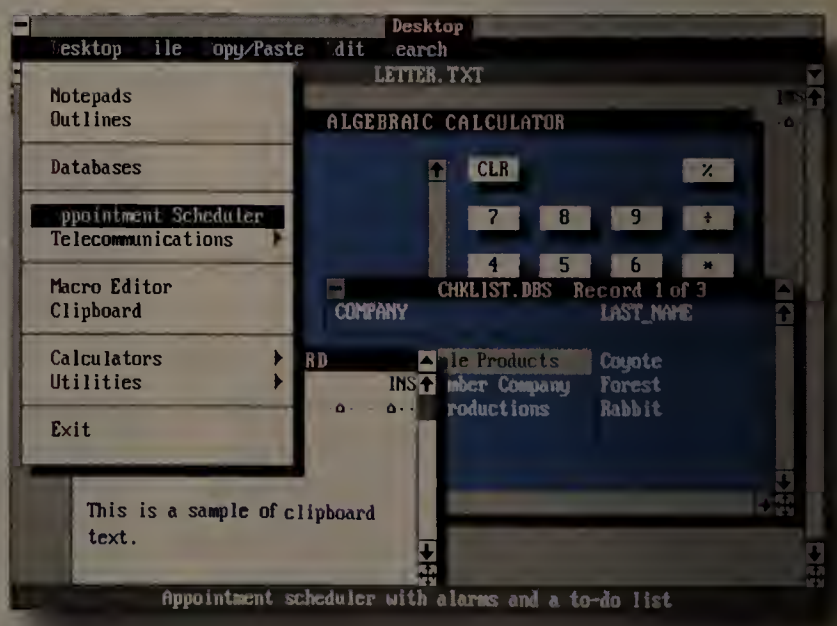

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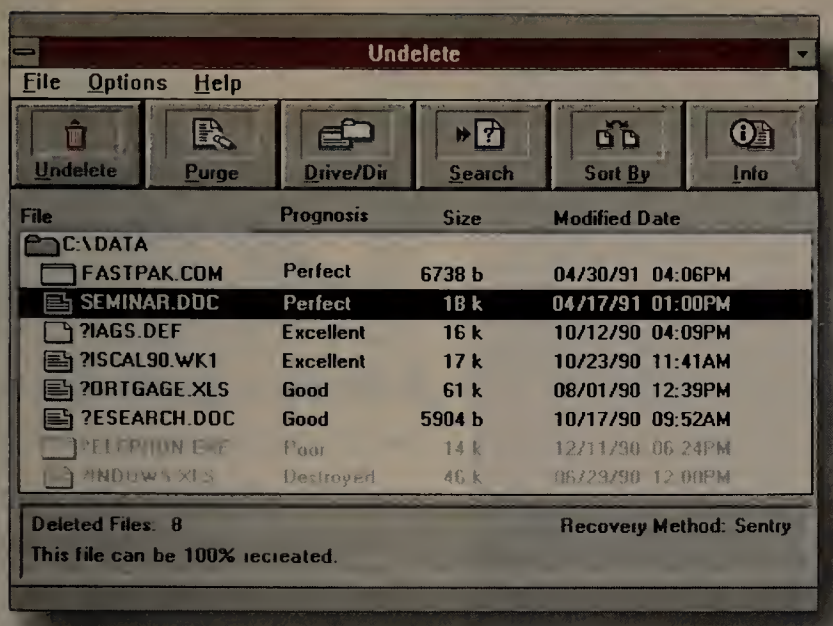

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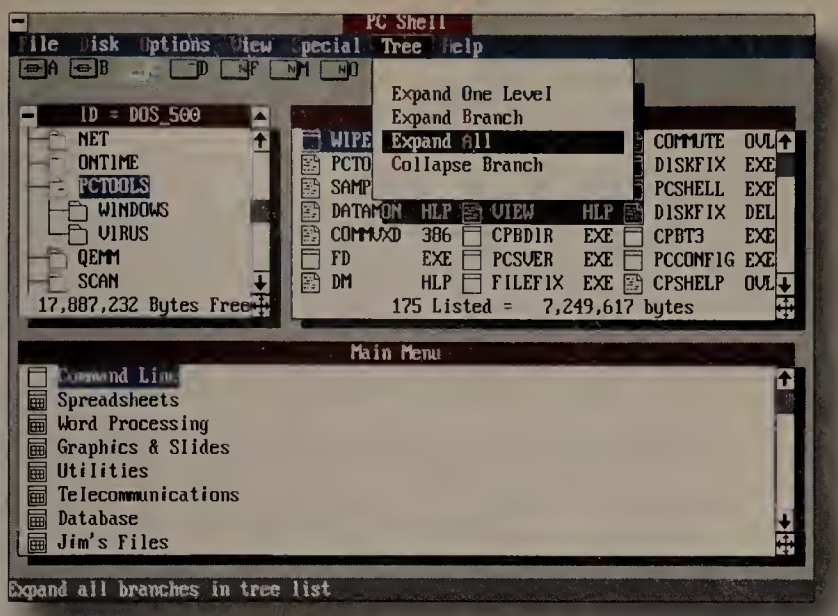

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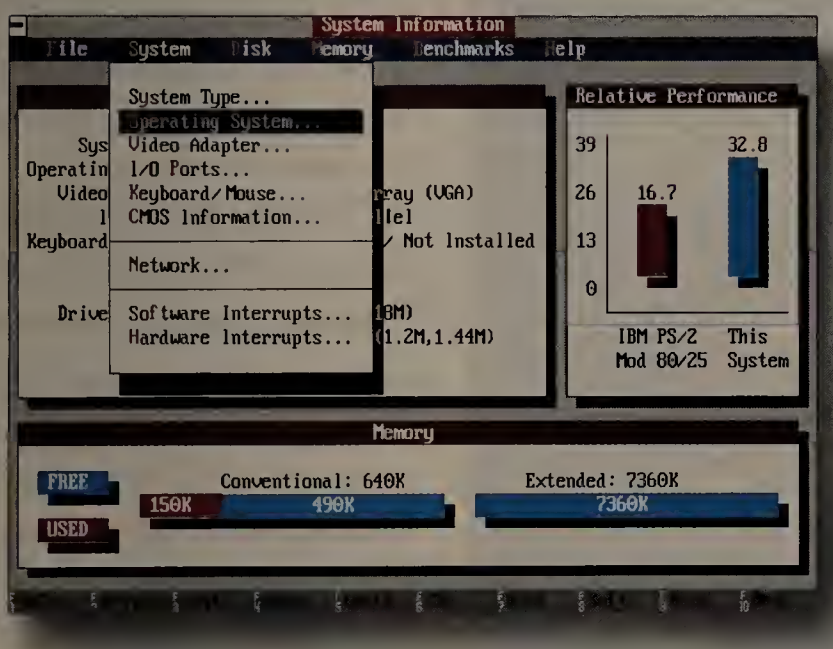

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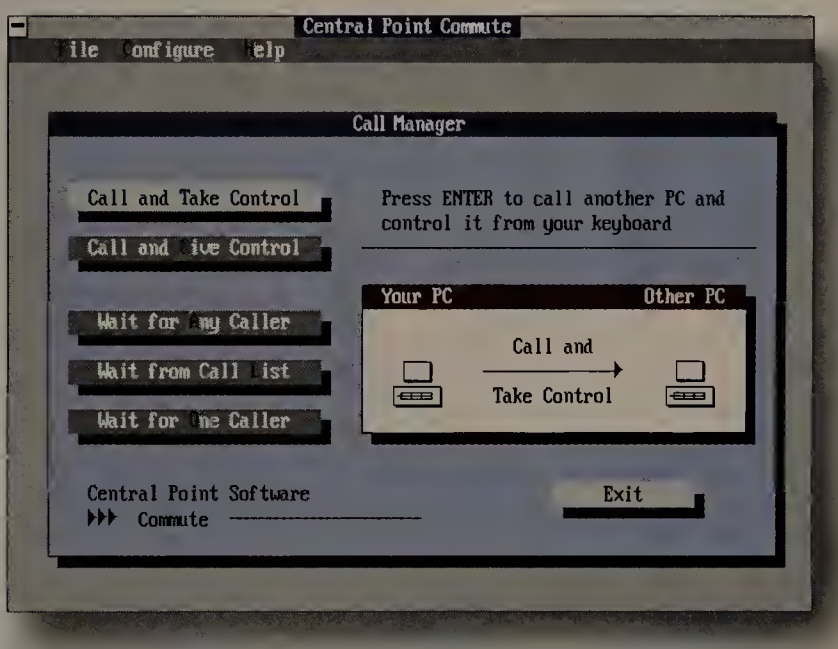

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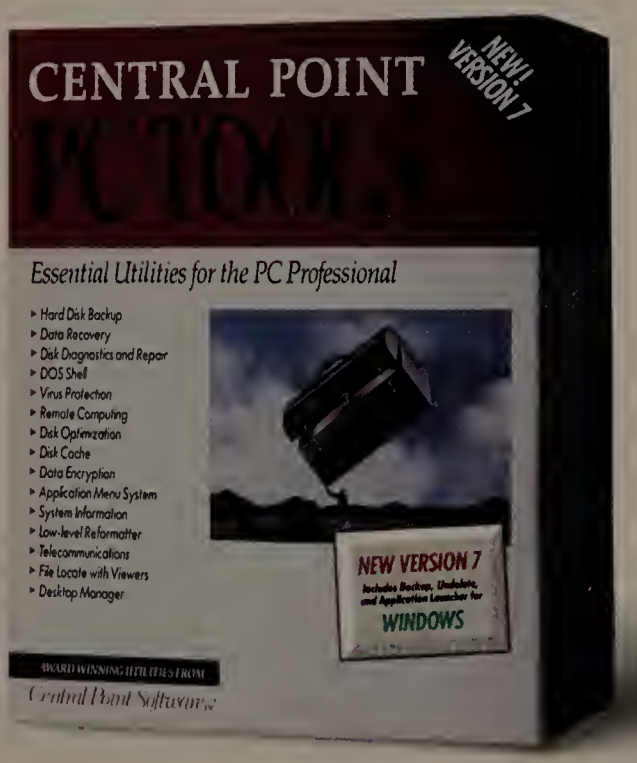

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Karl Koessel and Robert Lauriston

DOS TSRs and Windows

Q. *Is there a way I can use different drivers and TSRs (memory-resident utilities) with the DOS applications I'm running under* Windows 3.0? *When running my CAD program under* Windows, *I'd like to be able to pop up* PC Tools' *memory-resident DOS shell and calculator and also be able to use the third mouse button (which requires a special driver), but I can't get this setup to work properly.*

Colleen O'Hara
Terre Haute, Indiana

A. Loading a set of memory-resident programs to use with a DOS application under *Windows* isn't too difficult. The trick is to set up a PIF file to run a batch file that loads the TSRs and then runs the program. If you can't install your mouse driver from the DOS prompt (and therefore, from a batch file) but must use a DEVICE= command in your system's CONFIG.SYS file, do that first.

To create, say, CAD.PIF, call up the *Windows* PIF Editor. For the Program Filename, enter **c:\batch\cad.bat** (if you don't keep your batch files in C:\BATCH, replace that string with the appropriate drive and directory). For the Window Title, enter **My CAD Program.** Set the memory requirements as needed, and if you're running *Windows* in 386-enhanced mode, click the Advanced button and set those options as appropriate.

Now create CAD.BAT; its list of commands should load your mouse driver (unless you've already set the DEVICE= command to do so) and TSRs and then start the CAD program itself. Save CAD.BAT in the directory where you keep your batch files. Finally, use the Program Manager's File New Program Item command, entering **cad.pif** in the Command Line text box, to create an icon for launching your CAD application.

If your application needs more environment space, you can modify CAD.PIF so that it runs COMMAND.COM and then the batch file: For the Program Filename, enter **c:\command.com**; for Optional Parameters, enter **/e:512 /c c:\batch\cad.bat**. The '/e:512' gives the DOS session more environment space, and the other parameters cause DOS to run CAD.BAT.

When you're through working in your CAD program, exit it and then press **<Ctrl>-C** to unload the TSRs and end the DOS session.

Improve 1-2-3's Memory Management

Q. *I have 2MB of RAM in my computer, yet* 1-2-3 *sometimes gives me a 'Memory Full' message when I load a spreadsheet of only 520K. What takes up the other 1.5MB?*

Donald L. Johnson
Nashville, Tennessee

A. When you get that message, you probably have nearly 1MB of expanded memory still free. The problem is that *1-2-3 2.2* and earlier versions require a "pointer" in base memory for each cell that's stored in expanded memory. After you load DOS and *1-2-3* (without a spreadsheet), there's less than 300K of base memory left, so pointers can use it up long before you run out of expanded memory. (Later versions of *1-2-3* avoid the problem through more efficient memory management.) For *2.2* and earlier releases, installing Intex Solutions' *Beyond 640* add-in lets you avoid the pointer problem and use 4MB of expanded memory.

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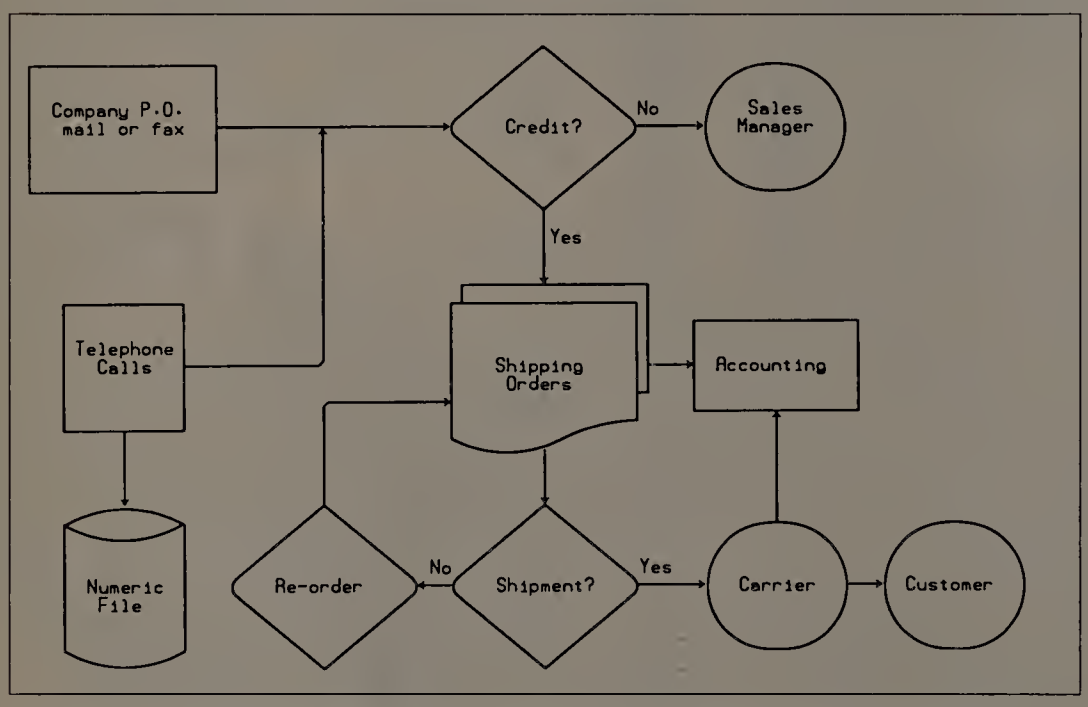

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puter. We'd like to be able to search for documents by customer name or case number, then view them. Is our 286 clone with 640K of RAM, a 40MB hard disk, and Hercules graphics up to the job? What software do we need?

Betty Chin
Seattle, Washington

A. *Hotshot Imagebase* is one application we've found that lets you easily organize and display scanned images. But it doesn't support Hercules graphics, so you'll need to upgrade to a VGA video board and a VGA monitor. If your photographs are black and white, you won't really need color—a monochrome VGA monitor will do fine. Because each full-page scanned document can take up to 180K, you'll need about 18MB of free hard disk space for each 100 images. For 2000 scanned documents, you'll need a 600MB hard disk (a 300MB disk would probably hold only about 1500; the next size up is 600MB).

So, your system would be able to handle the job—once you have upgraded its hard disk, video board, and monitor. Given today's prices, consider selling your AT clone and buying a system that's configured to meet your needs. Also, if retrieval speed is not critical, consider an internal or external Bernoulli, which uses 44MB removable cartridges. You may find the savings over a 600MB hard drive attractive.

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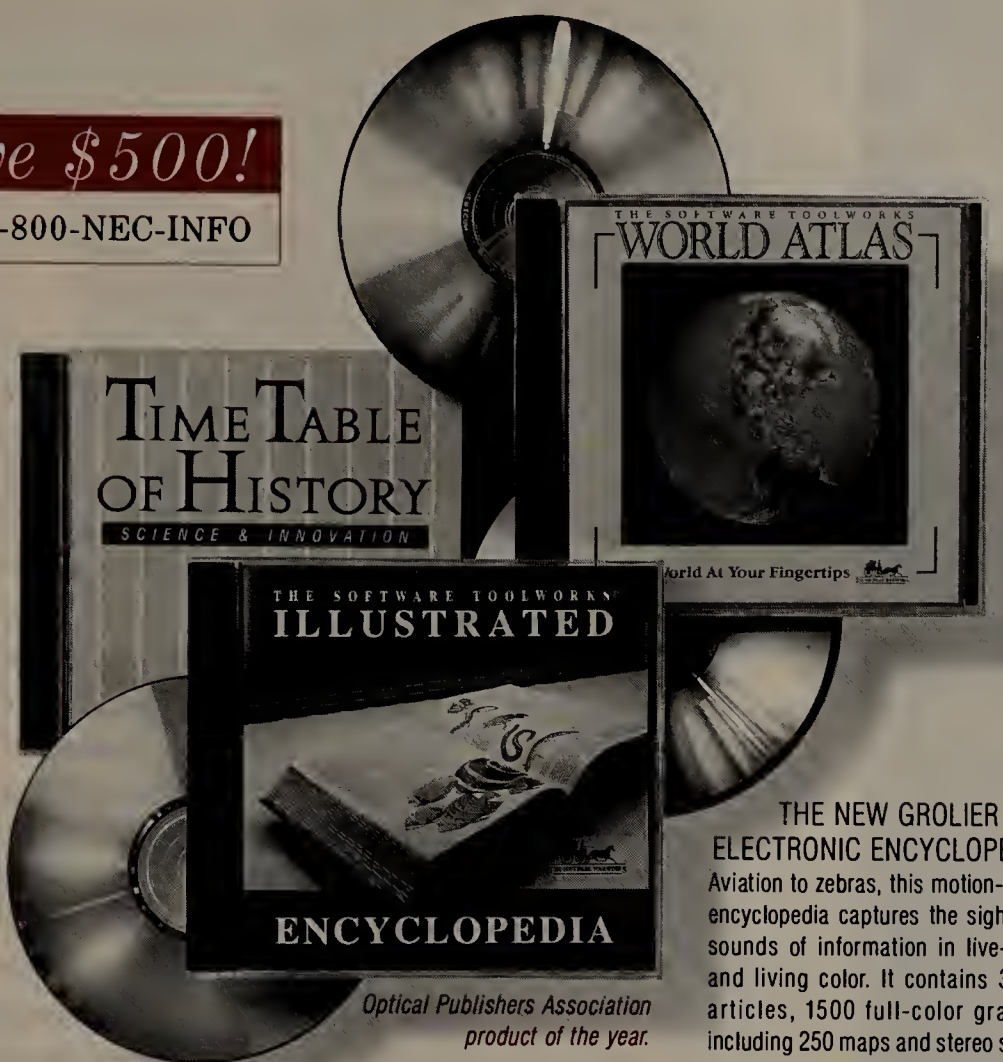

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C&C Computers and Communications

NEC

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```
{LET A1,@CELLPOINTER("contents")}
{IF @ISNUMBER(A1)}{QUIT}
{DOWN}
{IF (@LEFT(A1,1))<(@LEFT(@CELLPOINTER("contents"),1))}{/ Row;Insert}~{DOWN}
{BRANCH NAMELIST}
```

FIGURE 1: This Quattro Pro macro runs through an alphabetically sorted list and inserts a blank row between the A's and B's, B's and C's, and so on.

Delete Unneeded Copy Protection Files

Q. *I've been trying to remove an old copy-protected program from my hard disk. I used a freeware utility to reveal its hidden files, but when I try to delete them I get the message 'Access denied'. Is there some way I can get rid of these files?*

Kenneth Kramer
Colorado Springs, Colorado

A. Those files are not only hidden, they're probably also set as "read only." Use the DOS command ATTRIB to shut off the read-only attribute, and you should be able to erase them. For example, if the troublesome file is called PROTECT.FIL, you'd enter **attrib -r protect.fil** at the C> prompt. If you're using an old version of DOS without ATTRIB (it was added in 3.0), try a shareware or commercial collection of disk utilities; most can also reset the read-only attribute.

Break Up an Alphabetical List

Q. *To make an alphabetical list of names more readable, I insert a blank row between the* A's *and* B's, B's *and* C's, *and so on. Can I use a* Quattro Pro *macro to automate this task?*

E. W. Kennedy
Whispering Pines, North Carolina

A. The five-line macro shown in **FIGURE 1** does the trick. You'll need to assign one cell in the worksheet as a work area for the macro. Here we've used A1, but you can replace that with any cell or one-cell range name in the worksheet away from the list of names, or a cell or range name in the file that holds your macro library. Be sure that you don't add any characters, including trailing blanks, to any of the macro lines.

To use the macro, make sure there are no blank lines before the end of the list and that the list is sorted. Then position the cell pointer on the first cell of the name list, and run the macro. First, the macro copies the contents of the current cell to the work cell. To avoid getting into an endless loop, it then checks to see if the work cell is a number (since a blank line is seen as a zero), in which case it stops running. Otherwise, it moves down to the next cell in the list. The next command checks to see if the first character of the work cell is "less" (has a lower ASCII value) than the first character of the now-current cell. If so, *(continues)*

POWER TIP NO. 194

List All of the Directories All the Time...

You can list most subdirectories by entering **dir *.** at a directory's DOS prompt, but your list will include files without extensions and won't include subdirectories with extensions. Enter **dir¦find "<DIR>"** at the DOS prompt if you want to list the names of all the subdirectories in the current directory. To make the process even easier, put the command in a batch file with a memorable name, such as SUB.BAT or SUBDIR.BAT.

R. D. Rathod
Littleton, Colorado

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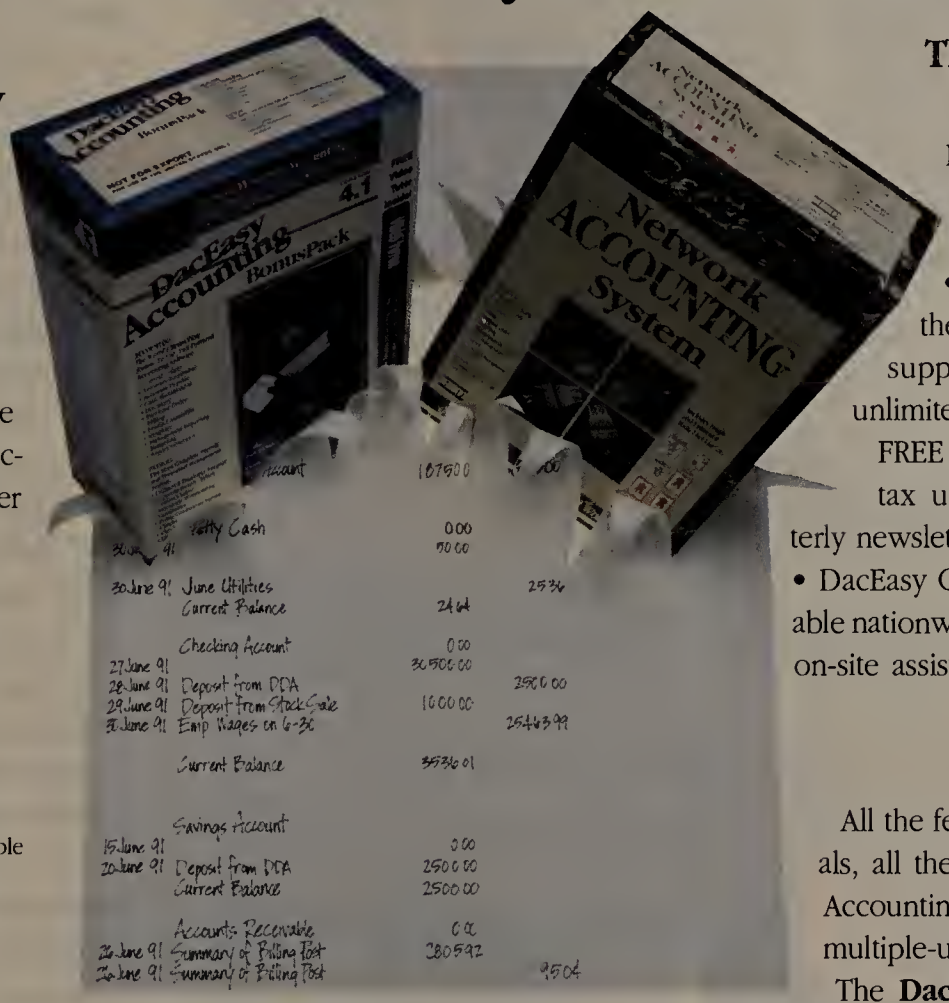

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- Mouse support (optional)
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- Complete line of forms & checks available

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- Modifiable sample chart of accounts
- Allows 13 user defined periods
- Allows up to 18 months open
- Auto-reversing transactions

Accounts Receivable

- Open invoice/balance forward/cash
- Flexible aging reports
- Automatic finance charges
- Supports partial payments

Accounts Payable

- Prints 1099 (Misc)
- Multiple checking accounts

Cash Management

- Handles deposits, prints checks
- Account reconciliation
- Writes checks from G.L.

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- Point-of-sale invoicing
- Sales analysis report

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- Internal product building *before* billing
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- Purchase journal/unlimited items per P.O.

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- Year-to-date comparison

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- Bar, 3-D bar, 3-D pie, line, stacked bar, overlay bar, high/low close combination line and bar, & filled line graph capability
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- Builds custom reports using any field
- Generates reports from master files
- View reports on screen

MEDIA CODE: PCW

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Hardware Requirements: IBM or compatible PC's, Accounting 4.1-640K, Hard Disk, DOS 3.1 or later, mouse optional. Payroll 4.1-512K, Hard Disk, DOS 3.1 or later, mouse optional. Network Accounting-NetBIOS Compatible LAN, 640K, DOS 3.1 or later, mouse optional. Rolodex is a trademark of Rolodex Corp. DacEasy is a trademark of DacEasy, Inc. © Copyright 1991. All rights reserved.

* Editor's Choice 1985 for Version 1.0, 1987 for Version 2.0.

PC WORLD 1986 · PC WORLD 1987 · PC WORLD 1988 · PC WORLD 1989 · PC WORLD 1990 · PC MAGAZINE EDITORS' CHOICE 1985, 1987* · INFO WORLD 1987 PRODUCT OF THE YEAR · INFO WORLD 1989 PRODUCT OF THE YEAR

Circle 94 on reader service card

the pointer is at the beginning of the next alphabetic section, and the macro inserts a blank row and moves down a cell. Then it loops back to continue running the macro from the beginning. (If you don't want to name the macro NAMELIST, revise the last line to branch to the name you want to use.)

1-2-3 users can also use this macro if they make one modification: Replace '{/ Row;Insert}~' with **/WIR~** to tell *1-2-3* to insert a row.

How does...? What can...? Should I...? Send your PC questions to The Help Screen, PC World, *501 Second St. #600, San Francisco, CA 94107-1431; CompuServe 74055,412; MCI Mail PC World Editorial; or 415/442-1891 (fax). Questions with the broadest appeal will be published.*

Karl Koessel is the technical editor and Robert Lauriston a contributing editor for PC World.

POWER TIP NO. 195

Crossing Borders in 1-2-3

1-2-3's Worksheet Titles Horizontal, Vertical, and Both commands help keep your place by displaying titles on the edges of the screen as you scroll through large worksheets. But they also prevent you from getting into the titles area using just the cursor keys. To move your cursor into the titles area, press the GoTo key (**<F5>**) and specify the address cell. Or press **<F5>**, use the cursor keys to point to the cell, and press **<Enter>**. Once you're inside the titles area, you can cursor to any cell to make needed changes.

Rex Farrance
Assistant Editor

All video display terminals (VDTs) emit electromagnetic radiation (EMR) through the screen. The photo on the left is a visualization of EMR in red from the screen. The photo on the right shows that the NoRad Shield™ virtually eliminates screen-emitted E-Field EMR and better than half of magnetic EMR.*

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*Greater than 50% magnetic (H field) attenuation above 30 KHz.
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NoRad Corporation 1549 11th St.
Santa Monica, CA 90401
213-395-0800
Fax: 213-458-6397

Circle 180 on reader service card

NETWORK Q&A

Make Moving Your LAN as Safe and Painless as Possible

Keith Nickerson

Q. *We're moving to new offices at the end of the year, and I'm worried that our server and workstations won't survive the trip intact. I'm also concerned that the LAN might not work properly at the new location. Can you give me any advice on how to avoid trouble?*

Barbara Gunderson
Council Bluffs, Iowa

A. Moving a LAN isn't easy, and without proper care it can become a frustrating ordeal. Here are some simple steps you can take to smooth your move.

Choose a mover that's specially equipped to move computers. Most large moving companies do have the proper padded cabinets to house and protect your machines during the move. Also, note that some computers' warranties require you to move the system in its original packing.

Hire an established, reputable company to lay the network cables in your new location or to check those already in place (it's easier to check disconnected cable segments for faults than it is to troubleshoot problems after everything's connected). Cut corners here, and you'll burn up more time and money fixing problems than you would have spent on a quality job in the first place.

Be sure you have adequate phone jacks, power lines, and ventilation in your new file server room. If you aren't planning the move yourself, make sure the planner is aware of and understands your requirements. If your new building has professional management, they should be able to calculate the required cooling from a list of how many and what types of machines you'll be housing there (the temperature should not exceed about 75 degrees). Large floor fans are a bad idea, as they spread dust and dirt that can seriously damage your machines.

Plan to take down your server at least one day before the move so the equipment can cool overnight. Warn your users well ahead of the appointed hour, and make sure they understand they may lose some of their work if they're logged in and have files open on the server when you take it down. Also, remind your users of their responsibility to back up their local hard drives. You don't want to be blamed for any data being lost during the move.

Fifteen minutes before you power down the server, use NetWare's SEND utility to warn users to save their work and log out. Send two more messages at 5-minute intervals before you finally shut down. Enter **disable login** at the file server console to prevent users from logging in, then use FCONSOLE (in NetWare 2.*x*) or MONITOR (in NetWare 3.*x*) to log out any users still connected.

When all user connections have been terminated and all files are closed, make at least two complete, verified backups of the file server.

Be certain all the workstations' hard drives are "parked" before you unplug them for packing. Most newer PCs do this automatically when the machine is shut down, but with older machines you'll have to park the drives manually.

Tape all power cords and other cables to the appropriate CPU or printer before the movers pack them away. That way you won't have to hunt for them when you're unpacking.

Keep an eye on your file servers as the movers pack and unpack them. Movers are often not fully aware of the delicacy and value of the equipment they're moving, and a word of advice at the right time can save expensive trouble later.

Even with the best of planning, something can always go wrong. Be sure all your equipment is properly insured against damage during the move.

Finally, allow plenty of time to get things up and running again in your new offices. It's almost certain to take longer than you expect.

Keith Nickerson is the editor of NetWare Advisor *and a member of the publishing team at Business Systems Group, a Houston-based systems integration firm.*

POWER TIP NO. 196

Save Space and Display Large Values in Excel

When a column isn't wide enough to display formatted values in a worksheet, *Excel* fills the column with '####'. But if you convert the value to text using the TEXT function, it will display in a narrow column, with the excess displaying if the cells to the right are empty.

Suppose you want to display the current date and time at the top of your worksheet but don't want to set a column wide enough to display 'January 15, 1991, 11:05 PM' as a value. Just enter the formula **=text(now(),"mmmm d, yyyy,\ h:mm am/pm")** into a cell of any width greater than zero, and then align the text as you wish. The date will be displayed in its entirety, allowing you to maintain narrow columns.

Charles W. Kyd
Lynwood, Washington

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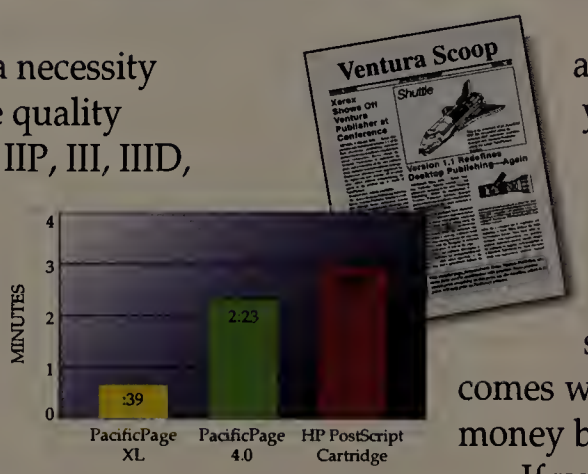

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If you're looking for a change of pace in PostScript language solutions for the HP LaserJet printer, call your nearest dealer or contact Pacific Data Products, 9125 Rehco Road, San Diego, California 92121, USA. **(619) 597-4630**, Fax (619) 552-0889.

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CONSUMER WATCH

Advice and information for the computer consumer

National Guide to User Groups

Roberta Furger

Whether you'd like information on new products, fellowship with other PC users, or training on the latest hardware and software, chances are you'd benefit by hooking up with a PC user group.

To that end, we've updated our annual list of user groups in the United States. Our thanks to the Association of PC User Groups (APCUG), a Washington, D.C., umbrella organization for user groups, and to Fog International Computer Users Group, for their assistance in compiling the listing.

Our apologies if your group is not listed. We included only groups whose information we could verify with a member. If you don't see your group in the following pages, send us the details, and we'll include you in our next list.

ABBREVIATIONS KEY

NL: newsletter
SIG: special interest group
TS: technical support
TE: training and education
SL: software library
BBS: bulletin board system

(Groups listed alphabetically by state and city.)

ANTHONY RUSSO

ALABAMA

Birmingham IBM PC User Group
P.O. Box 19248
Birmingham, AL 35219-9248
205/871-1939
$20/yr.; NL, 8 SIGs, TS, TE, SL

Huntsville IBM PC Users
P.O. Box 16013
Huntsville, AL 35802
205/539-5940
$20/yr.; NL, 4 SIGs, TE, SL, BBS

ALASKA

Polar PC User Group
P.O. Box 72934
Fairbanks, AK 99707
907/452-2500
$10/yr.; NL, TS, TE, SL

ARIZONA

Phoenix PC Users
P.O. Box 35637
Phoenix, AZ 85069-5637
602/943-7907
$40/yr.; NL, 7 SIGs, TS, TE, SL, BBS

South Mountain Users
P.O. Box 50002
Phoenix, AZ 85076
602/963-2989
$30/yr.; NL, 5 SIGs, TS, SL

Tucson Computer Society
P.O. Box 1489
Tucson, AZ 85702
602/577-3261
$24/yr.; NL, 15 SIGs, TS, TE, SL, BBS

ARKANSAS

Arkansas/Oklahoma PC Users Group
P.O. Box 853
Fort Smith, AR 72902-0853
501/784-8400
$20/yr.; NL, 4 SIGs, TS, TE, BBS

Central Arkansas PC Users Association
P.O. Box 2095
Little Rock, AR 72203
501/225-9304
$24/yr.; NL, TS, SL, BBS

Twin Lakes Computer Users Group
Rt. 5, Box 127
Mountain Home, AR 72653
501/425-9061
$15/yr.; NL, TS, TE, SL, BBS

NW Arkansas Microcomputer Users
Rt. 4, Box 376
Springdale, AR 72764-9307
501/361-2963
$15/yr.; NL, TS, TE, SL

Jonesboro User Group
P.O. Box 838
State University, AR 72467
501/935-6659
$12/yr.; NL, 4 SIGs, TE, TS, SL, BBS

CALIFORNIA

Berkeley PC/ Compatibles Users
c/o Mel Mann
1145 Walnut St.
Berkeley, CA 94707
415/526-4033
No fee; NL, TS, TE, SL, BBS

Valley Computer Club
P.O. Box 6008
Burbank, CA 91510-6008
818/842-3707
$25/yr.; NL, 3 SIGs, TE, SL, BBS

Fog International Computer Users
P.O. Box 3474
Daly City, CA 94015
415/755-2000 (days)
$30/yr.; NL, 4 SIGs, TS, TE, BBS

Color America, Inc.
c/o Robert Marvin
1466 Spruce Tree Dr.
Diamond Bar, CA 91765
714/861-2949
$20/yr.; NL, 2 SIGs, BBS

IBM Humboldt Users
P.O. Box 6721
Eureka, CA 95502
707/442-4621
$27 first year, $12/yr. thereafter; NL, 2 SIGs, TS, TE, SL

Microlink PCUG
c/o Bob Discount
15865-B Gale Ave. #1003
Hacienda Heights, CA 91745
818/917-6470
$25/yr.; NL, SL, BBS

Antelope Valley Microcomputer Users
P.O. Box 2942
Lancaster, CA 93539
805/948-5166
$20/yr., $10 initiation fee; NL, TS, TE, SL

San Luis Obispo PC Users Group
c/o Bob Ward
2100 Andre Ave.
Los Osos, CA 93402
805/528-0121
$20/yr.; NL, 2 SIGs, TS, TE, SL, BBS

Monterey Bay Users
c/o Lee Keely
177 Webster St. #A354
Monterey, CA 93940
408/373-6245
$25/yr.; NL, 2 SIGs, TS, TE, SL

Napa Valley PC Users
P.O. Box 2653
Napa, CA 94558
707/255-9241
$15/yr.; NL, TS, SL, BBS

Channel Islands PC Users' Group
P.O. Box 5025
(continues)

Oxnard, CA 93031
805/983-4741
$20/yr.; NL, 2 SIGs, TS, TE, SL, BBS

Pasadena IBM Users Group
c/o Steve Bass
711 E. Walnut St. #306
Pasadena, CA 91101
818/795-2300 (days)
$42/yr.; NL, 9 SIGs, TS, TE, BBS

Riverside IBM Computer Club
c/o James Heidecke
7860 Live Oak Dr.
Riverside, CA
92509-5339
714/685-5407
$25/yr.; NL, TS, TE, BBS

Sacramento PC Users
c/o Milt Hull
P.O. Box 162227
Sacramento, CA
95816-2227
916/386-9865
$25/yr.; NL, 25 SIGs, TS, TE, SL, BBS

Inland Empire Computer Group
P.O. Box 5281
San Bernardino, CA
92412-5281
714/864-3093
$20/yr.; NL, SL, BBS

San Diego Computer Society
P.O. Box 81444
San Diego, CA 92138
619/549-3787
$25/yr.; NL, 20 SIGs, TS, TE, SL, BBS

San Francisco Business Computers
c/o Jordan Rosenberg
455 Vallejo St.
San Francisco, CA
94133
415/788-5338
No fee; NL, TS, BBS

San Francisco Computer Society
P.O. Box 783
San Francisco, CA
94101
415/929-0252
$30/yr.; TS, TE, SL

San Francisco PC Users Group
3145 Geary Blvd. #155
San Francisco, CA
94118-3316
415/221-9166
$35/yr.; NL, 19 SIGs, TS, TE, SL, BBS

Santa Barbara PC Users Group
c/o Wayne McCall
281 Oak Rd.
Santa Barbara, CA
93108
805/969-9961
$20/yr.; NL, 7 SIGs, TS, TE, SL, BBS

Silicon Valley Computer Society
c/o Bert Stephens
2464 El Camino Real
#190
Santa Clara, CA 95051
408/286-1271
$30/yr.; NL, 17 SIGs, TS, TE, BBS

North Bay Users
P.O. Box 7156
Vallejo, CA 94590
707/644-9327
$18 first year, $15/yr. thereafter; NL, 5 SIGs, TS, TE, SL, BBS

COLORADO

Metro Area Computer Enthusiasts
P.O. Box 440247
Aurora, CO 80044
303/830-9143
$20/yr.; NL, 2 SIGs, TS, TE, SL, BBS

Colorado Springs PC Users Group
P.O. Box 1028
Colorado Springs, CO
80901
719/596-6938
$30/yr.; 3 SIGs, TS, TE, SL, BBS

Mile High Computer Resource Organization
P.O. Box 5226
Denver, CO 80217
303/286-7455
$25 first year, $20/yr. thereafter; NL, 2 SIGs, TS, TE, SL, BBS

Windows on the Rockies User Group
P.O. Box 9929
Denver, CO
80209-0929
303/733-1277
$30/yr. (corporations $60/yr.); NL, TS, SL

Front Range PC Users
c/o Rick Mattingly
305 W. Magnolia #152
Fort Collins, CO 80521
303/223-8654
$25/yr.; NL, 6 SIGs, TS, TE, SL, BBS

Chaffee County Computer Club
P.O. Box 1123
Salida, CO 81201
719/539-3884
$18/yr.; NL, TS

CONNECTICUT

Central CT PC (PCjr) Group
c/o Bob Gauthier
781 Main St.
Coventry, CT 06238
203/742-6083
$6/yr.; NL, SIG, TS, TE, SL

Connecticut IBM PC Users' Group
P.O. Box 291
New Canaan, CT
06840
203/762-0229
$25/yr.; NL, 6 SIGs, TS, SL, BBS

Trumbull PC Users
P.O. Box 545
Trumbull, CT 06611
203/334-4267
$20/yr.; NL, 3 SIGs, TE, SL, BBS

Business & Professional Micro Users Group
P.O. Box 1468
West Hartford, CT
06107
203/242-6587
$15/yr.; NL, 2 SIGs, TS, TE

DELAWARE

PC Professional Users
c/o Glenn Bleakney
1601 Concord Pike
Wilmington, DE 19803
302/656-8200
$20/yr.; NL, 4 SIGs, SL, BBS

DISTRICT OF COLUMBIA

Capital PC Users
51 Monroe St.,
Plaza E. #2
Rockville, MD 20850
301/762-6775
$35/yr.; NL, 35 SIGs, TS, TE, SL, BBS

Association of PC User Groups, Inc. (APCUG)
1730 M St. NW #700
Washington, DC 20036

FLORIDA

Polk IBM PC Users
c/o Steve LaLonde
2182 Lake Ariana Blvd.
Auburndale, FL
33823-3549
813/967-5746
$20/yr.; NL, 9 SIGs, TS, TE, SL, BBS

Manatee PC Users
c/o Dan Crumpler
411 67th St. NW
Bradenton, FL
34209-1652
813/792-3437
$20/yr.; NL, 10 SIGs, TS, TE, SL

Hernando/Citrus PC Users Group
c/o Joseph Gatti
P.O. Box 1106
Brooksville, FL 34605
904/799-4094
$10/yr.; NL, SL, BBS

Southwest Florida PC Users Group
P.O. Box 1466
Fort Myers, FL 33902
813/997-0910
$25/yr.; NL, 3 SIGs, SL

South Polk County PC Users Group
c/o Bill Goddard
815 N. Lake Reedy Blvd.
Frostproof, FL 33843
813/635-3381
No fee; TE

HogTown Hackers
c/o Bruce Ruiz
4623 N.W. 13th Ave.
Gainesville, FL 32605
904/392-3151 (days)
$15/yr.; TS, TE, SL, BBS

Miami PC User Group
c/o Jeffrey Feinberg
4651 Sheridan St.
#300
Hollywood, FL 33021
305/962-8889
$24/yr.; NL, 4 SIGs, TS, TE, SL, BBS

PC Users Group of Jacksonville
P.O. Box 47197
Jacksonville, FL
32247-7197
904/737-6327
$20/yr., $10 initiation fee; NL, 8 SIGs, TE, TS, BBS

Ridge Area Computers
c/o Web Austin
251 Tower Lakes
Lake Wales, FL 33853
813/676-5936
$20/yr.; NL, 3 SIGs, TS, TE, SL

Central Florida Computer Society
P.O. Box 948019
Maitland, FL 32751
407/332-2883
$20/yr.; NL, 11 SIGs, TS, SL

P.C.B.U.G.
P.O. Box 285
Naples, FL 33939
813/261-8208
$10/yr.; NL, TS, TE, SL

Charlotte County PC Users Group
P.O. Box 3530
Port Charlotte, FL
33949
813/624-3899
$25/yr.; NL, SIG, TS, TE, SL, BBS

Tri-County Computer User Group, Inc.
P.O. Box 7414
Port St. Lucie, FL
34985-7414
407/878-7763
$20/yr.; NL, 6 SIGs, TS, TE, SL, BBS

EpSuncoast Users' Group
c/o Dick Lee
1237 79 St. S
St. Petersburg, FL
33707
813/343-2668
$15/yr.; NL, TS, SL

Sarasota IBM PC Users
c/o Barton Koslow
4557 Camino Real
Sarasota, FL 34231
813/924-4480
$15/yr.; NL, 11 SIGs, TS, TE, SL

Fort Lauderdale Computer Users
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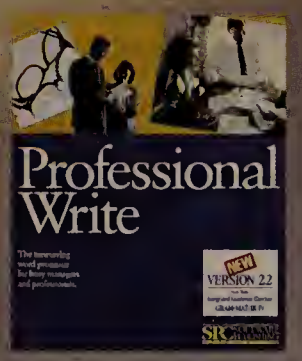

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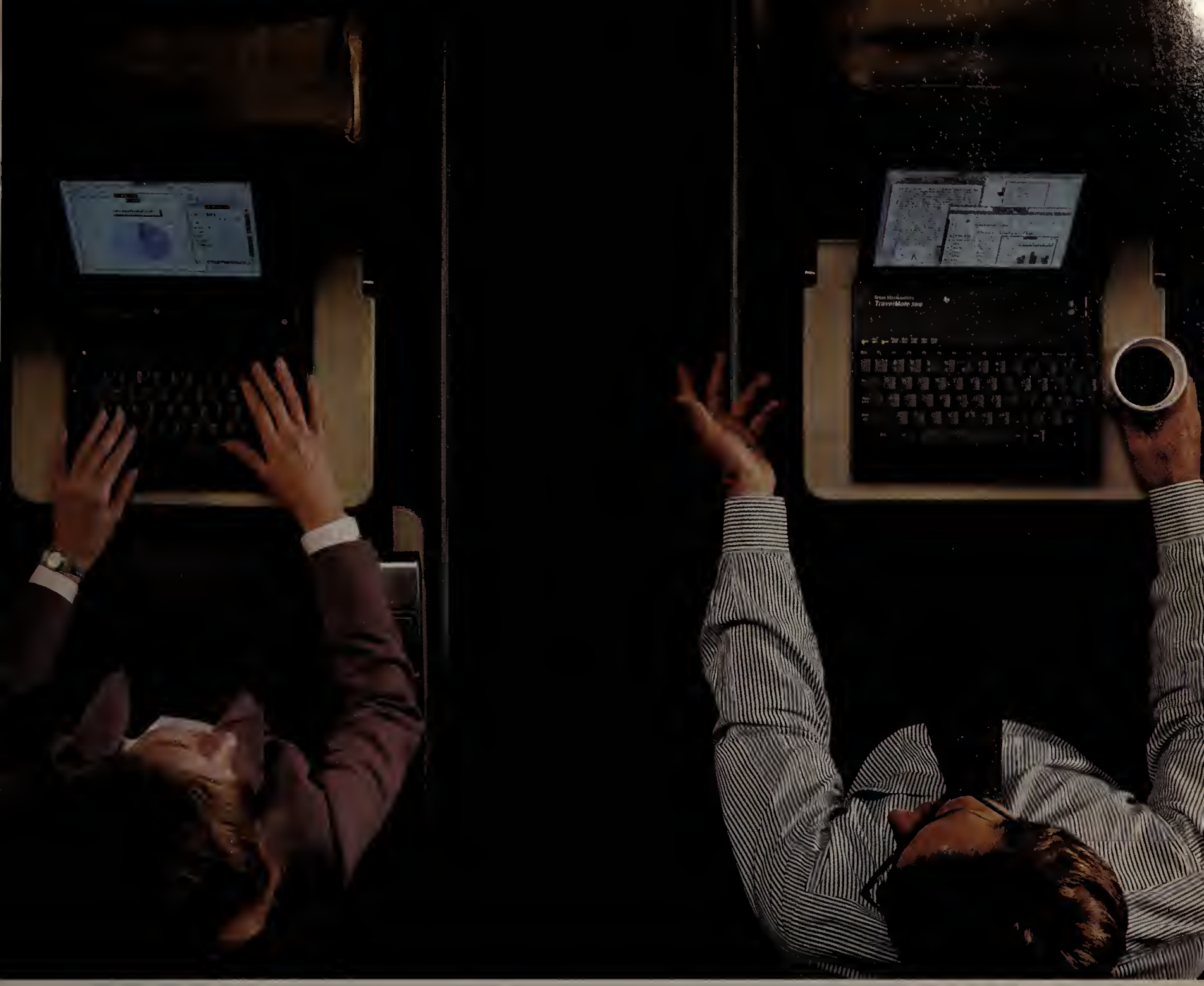

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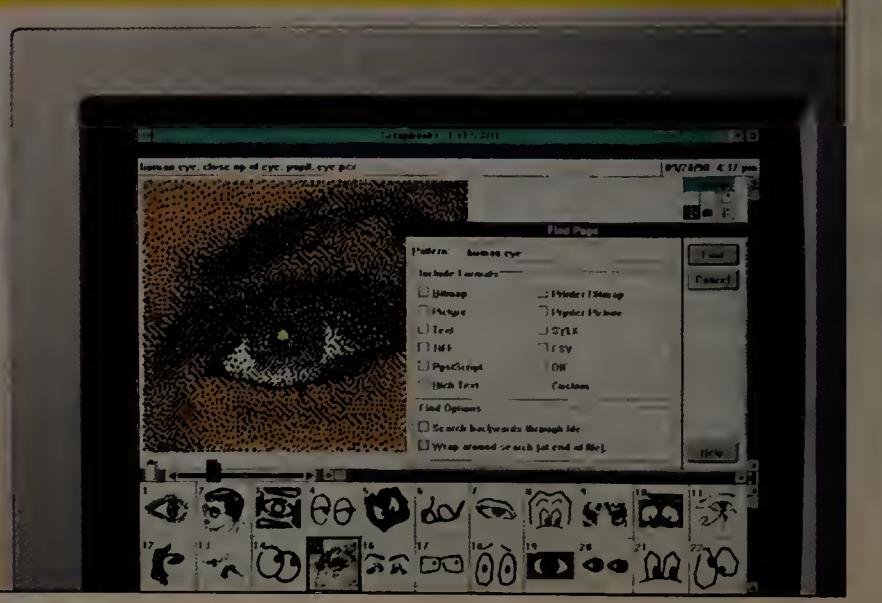

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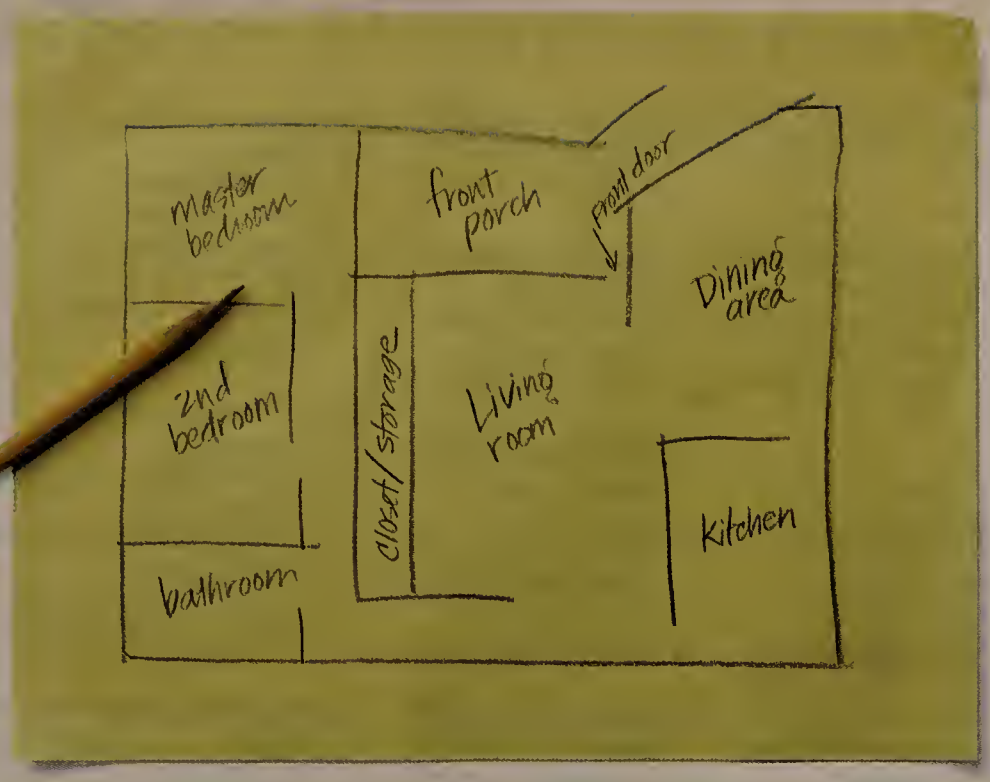

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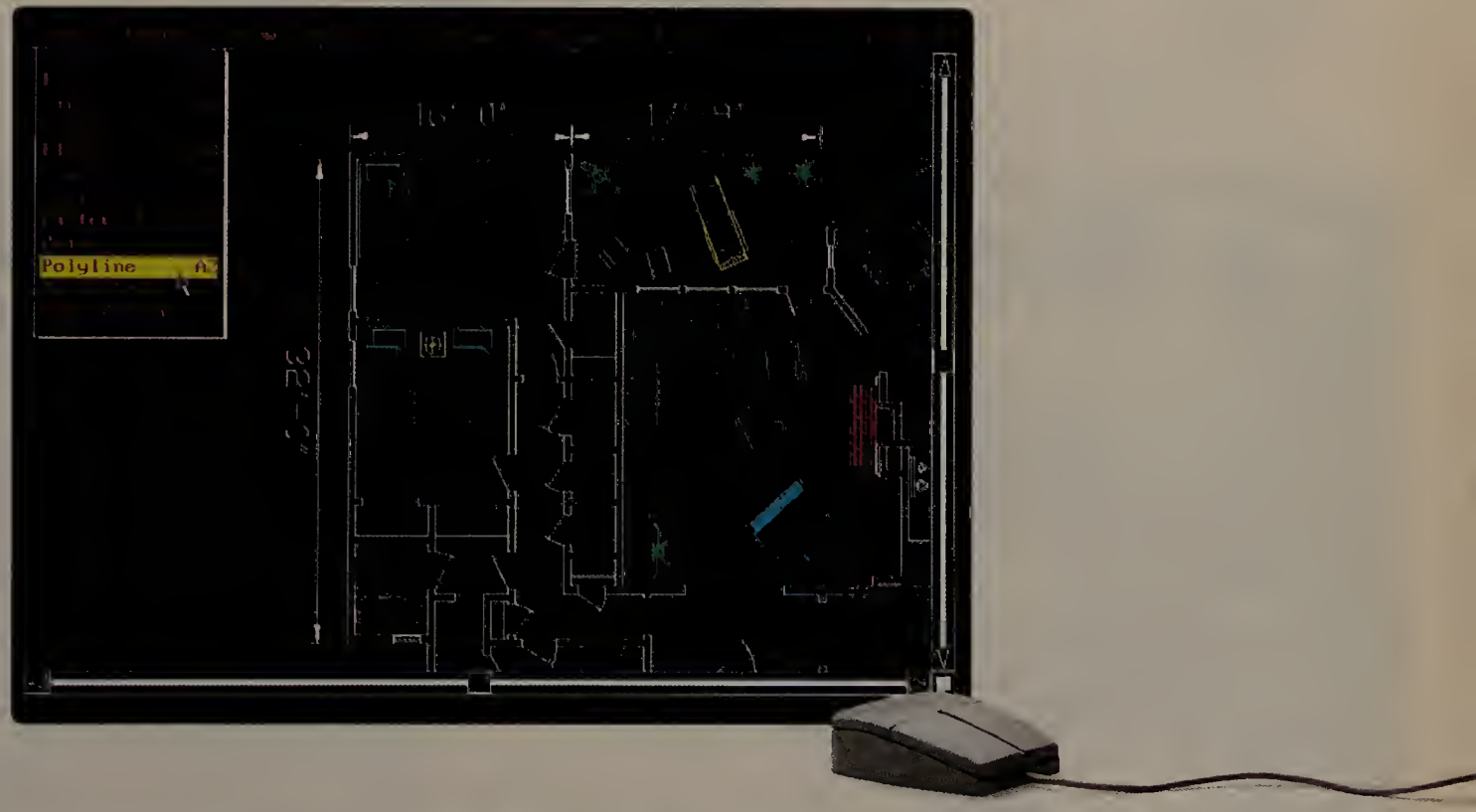

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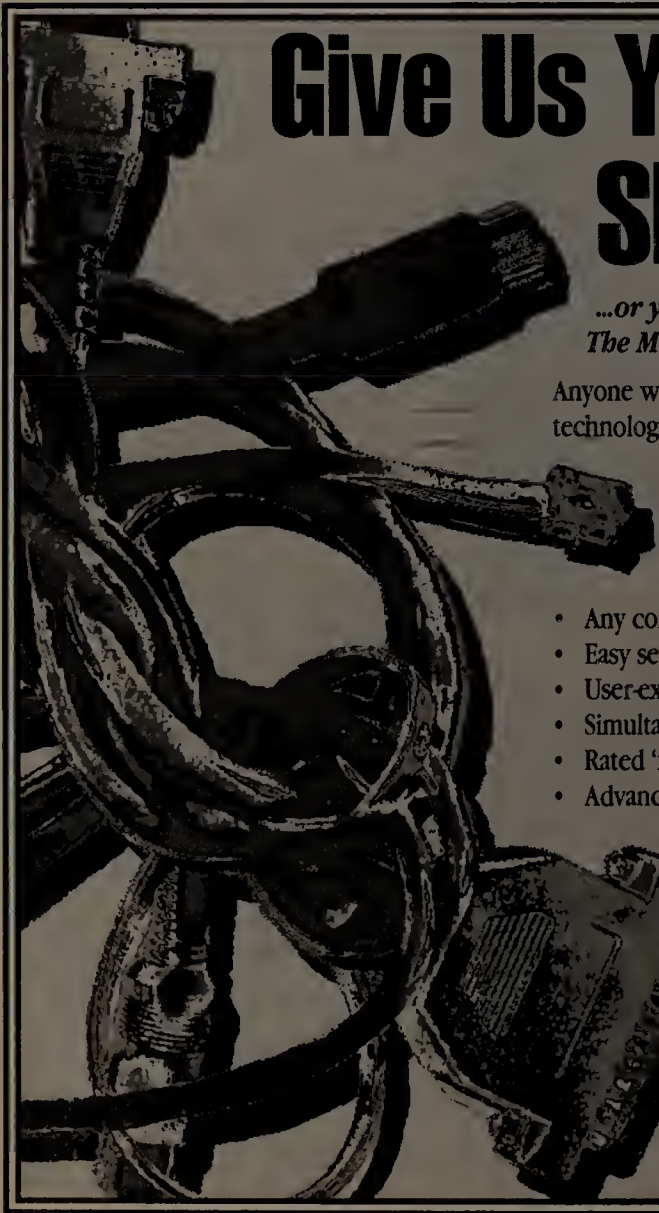

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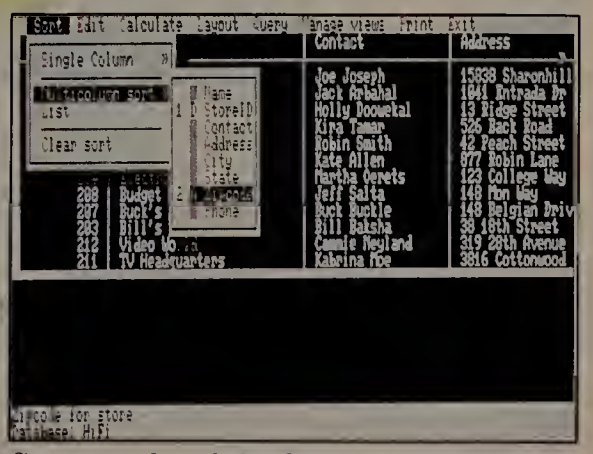

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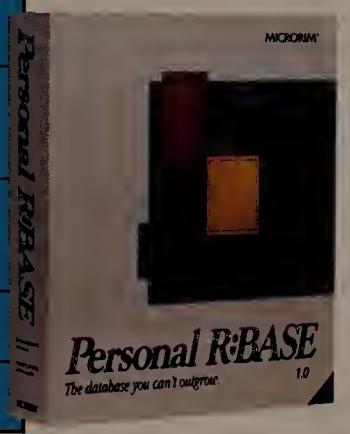

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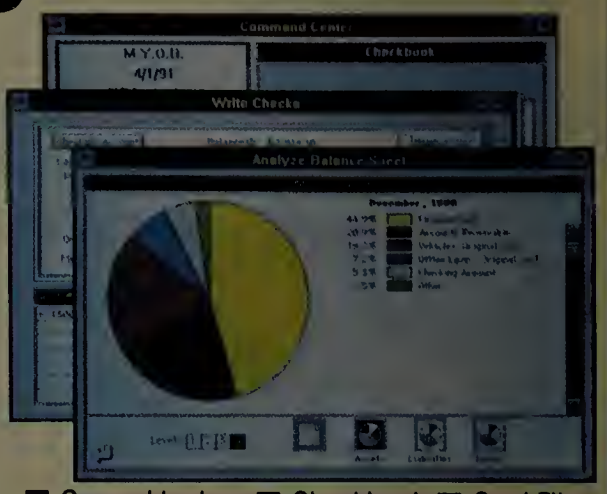

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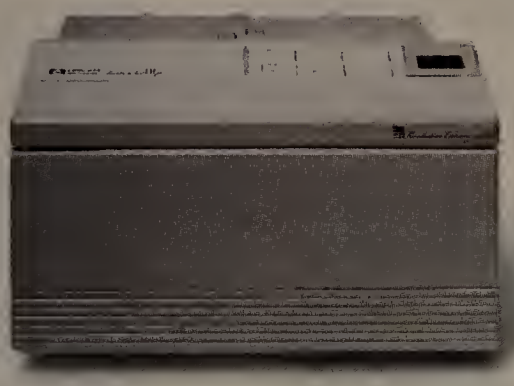

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After testing eight of the top notebook computers on the market, Byte Magazine said, "Buy the Toshiba T2000SX." Wait'll they try the T2000SXe.

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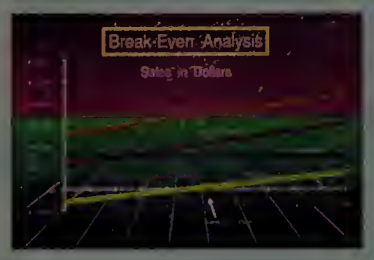

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Edited by ERIC BENDER

But Cellular Nets Need Data Enhancements

Mobile Professionals Gain Portable Offices

Wireless Links Complement Notebook PCs

With a notebook and portable printer, Bridgestone salespeople can close deals faster, says analyst Mike Withers.

SCOTT PETERSON

These days we barely notice the telltale antenna of a cellular car phone—except, of course, when the driver is engrossed in conversation rather than the morning traffic. But cellular phones and other communications advances are hooking up with portable PCs to make sales, accounting, engineering, and other mobile professionals as productive on the road as at the office.

Well-publicized and dramatic advances in notebook PCs are being followed by related developments in peripherals and communications. Printers weighing less than three pounds, pocket-sized fax/modems, cellular modems, paging devices that download messages to a PC— the pieces are starting to fall into place for the mobile professional, says Bill Lempesis, who publishes *The Lempesis Report* newsletter in Pleasanton, California.

Communications A-Go-Go

At Bridgestone Tires, of Nashville, all 175 district and territory sales managers are equipped with a Toshiba notebook with an internal fax/modem, a portable Kodak Diconix 150 Plus ink jet printer, and a pager. They can log on to the company's mainframe to download E-mail messages or get detailed reports about customers they'll be visiting; send and receive faxes to customers and the home office; and print out contracts and promotional literature from virtually anywhere.

"The key word is timeliness," says Bridgestone spokesperson John Taylor. "Under the old system, it might be several days before salespeople could get information to customers. In the past, deals have not happened because they did not happen quickly enough."

Other companies rely on wireless communications to give them even tighter links. Claims adjusters for one Northeast insurance company drive minivans outfitted with a PC, a printer, a video camera, a cellular phone, and a full-sized cellular modem. They visit customer sites, assess vehicle damage, and send reports with photos back to the home office via the cellular modem. They can write out checks for repairs on the spot. In the past, the process took two weeks.

Walk Before You Run

Companies of all sizes have compelling uses for wireless products and services, says International Data analyst Bruce Stephen, but the commercialization of wireless communications devices remains in its infancy.

Pocket cellular fax/modems are cheaper, but "cellular networks are still too messy for good data transmission," says Dataquest analyst Larry Cynar. Uneven geographical coverage, crowded communications channels, and the low quality of most networks plague customers trying to make the cellular leap. Fax/modem hardware advances combined with Microcom's new MNP 10 communications protocol should help considerably, says Lisa Simpson, product line manager for Rockwell International's Digital Communications Division.

Despite problems, computer companies see communications as an important element of future PC sales. AT&T is pushing harder than most with its Safari notebook, which features an optional cellular modem and portable paging device for downloading messages to the laptop. The potential market, says AT&T vice president Ed Cote, is 26 million professionals who spend most of their day out of the office. —*Roberta Furger*

MARK TUCKER

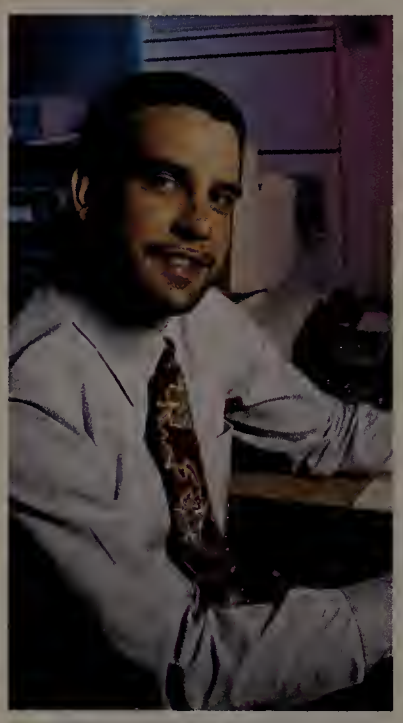
Mobile professionals don't have to leave home without a notebook PC, cellular phone, pager, or portable fax machine.

It's Not Products That Keep IBM on Top

Buyers Choose Stability and Support Over Price

In the Birmingham IBM PC User Group in Birmingham, Alabama, only two members own IBM PCs—old PCs at that. The group's other members bought compatibles because they "are aware there are better alternatives," says President Everett Huffman.

But customers keep buying from IBM—*a lot* of customers. IBM sold more than 1.5 million PCs last year in the United States alone, according to International Data Corporation estimates. "IBM has a strong presence in virtually all



Oil-Dri's Sam Colello applauds IBM service and support.

GWENDOLYN CATES

market segments, even the home market, and we anticipate it will remain the leading PC vendor," says IDC analyst Bruce Stephen.

Achieving High Comfort Levels

Why do so many users still choose to pay a premium for what many reviewers and customers agree are middle-of-the-road PCs?

First and foremost is the peace of mind that comes from dealing with the largest vendor. "This is particularly valuable at a time when there's so much uncertainty in the marketplace," says Bruce Johnson, PC manager at New York City law firm Sullivan & Cromwell. In these troubled times, it's comforting to buy a machine with those three magic letters on it, says Johnson.

Second comes service, particularly at large "True Blue" companies. "There are things more important than saving money," says Avery Cloud, manager of technical services at Bowman Gray/Baptist Hospital in Winston-Salem, North Carolina. An IBM representative is assigned permanently on site, and "the legendary IBM service and support are a reality for us," says Cloud.

For Oil-Dri of America, a Chicago mineral mining and manufacturing firm with six remote sites across the country, a single service contract that covers all PCs is essential. And, says MIS director Sam Colello, IBM was the only choice. "If I have a problem with a PC at a remote site, night or day, I make one call, and the problem is fixed," he says. "There's no finger pointing because I have nonstandard equipment. The support and service IBM gives us when something goes wrong exceeds the $500 or $1000 we'd save buying a clone."

Smaller firms also can share benefits from buying IBM. Not only can they get a machine repaired anywhere in the country at virtually a moment's notice, the repairs generally are cheaper because standard IBM parts are widely available. Moreover, the annual maintenance contract for an IBM PS/2 is usually several hundred dollars less than a contract on a no-name clone.

Connectivity and Compatibility

Additionally, connectivity remains a major issue. At First Security National Bank &

DAN DRY

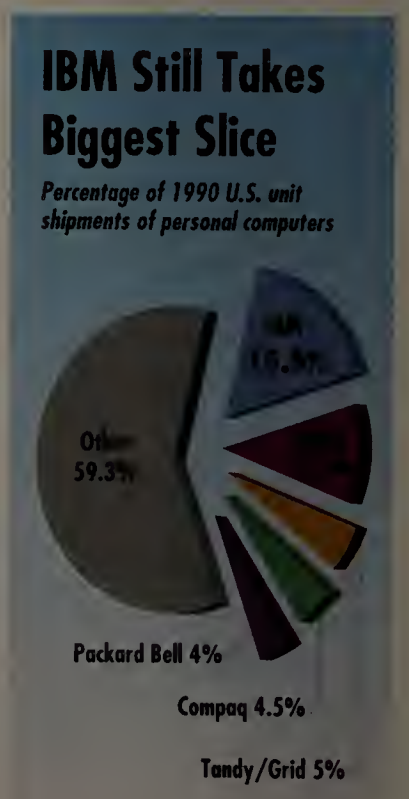
First Security's Brian Williamson can't connect with clones.

Trust in Lexington, Kentucky, PC services manager Brian Williamson admits that his organization "pays a penalty for buying IBM, and we know it." Still, says Williamson, as the bank's systems are increasingly being connected via networks, he's glad that he stuck with IBM. "As simple and economical as it sounds to buy from the low-cost provider, as soon as you try connecting clones, everything falls apart," he explains.

Mike Balog, president of PCI Engineering in Timonium, Maryland, admits that "the productivity-per-dollar ratio is probably lower than what you'd get with an Everex." However, Balog invested in five high-end PS/2s for his engineering consulting firm because of compatibility concerns. "As consulting engineers, the last thing we need to do is chase down software bugs," he says.

IBM's recent attempts to be more of a technology leader have won the company some grudging fans. "To be honest with you, I don't like IBM," says Hank Swan, owner of Atlantic Automobile Repairs in Baltimore. "As a small buyer, you're cut off from direct contact with the manufacturer and literally at the mercy of the local dealer." However, he bought IBM's portable 386 PS/2 because of its "technical punch."

Even IBM diehards see room for improvement. First Security's Williamson laments that IBM is often slow to get important products to market. Sullivan & Cromwell's Johnson wishes he didn't have to wait in line at his dealer for certain machines. And Oil-Dri's Colello voices what seems to be an age-old complaint: difficulty in prying product information out of Big Blue. But none are miffed enough to change brands.
—*Alice LaPlante*



Last year IBM easily held top place in U.S. personal computer sales, with about one-sixth of the 9.5 million systems shipped, according to International Data Corporation estimates.

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5 or 10 Ports

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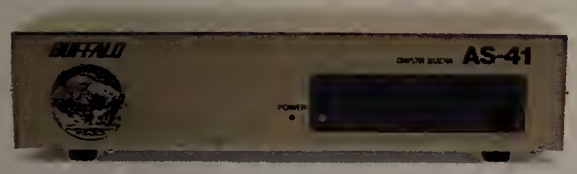
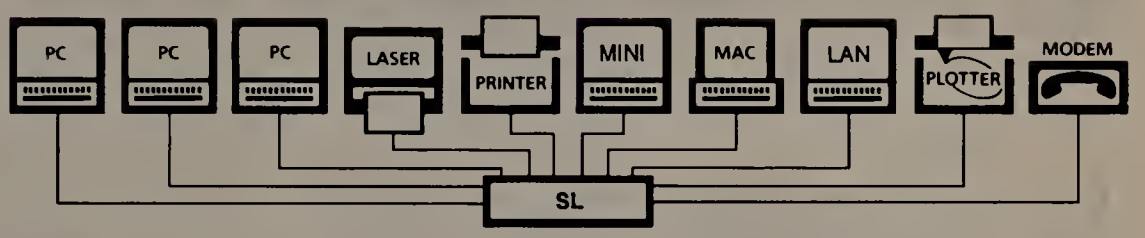
- *No PC RAM Memory Required*
- *Toll-Free Technical Support*
- *45-Day Money-Back Guarantee*



HWP — *5 Ports*

HWP-256	with 256KB	$325
HWP-512	with 512KB	$375
HWP-1000	with 1MB	$425



User Upgradable Memory:
From 256KB to 16MB buffer

Input/Output Settings – 4/1 or 3/2:
All parallel ports; user configurable as either three inputs to two outputs, or four inputs to one output, buffered auto-switch

Rapid Data Transfer – 100,000 cps:
The HWP uses Direct Memory Access (DMA) for data transfers into the buffer, making the HWP hardware capable of receiving parallel data at the high rate of 100,000 characters per second.

Pop-up Menu or Front Panel Buttons:
Use either the pop-up menu or the front panel switches to select printers, select the next available printer, send multiple copies, clear data, and other functions.

AS-41 — *5 Ports* — *$200*

Smart Switch – No Pop-up or Buffer:
Four parallel inputs to one parallel output, electronic automatic switch with no buffer

SPPS — *(not shown)* — *$100*

Interface Converter – No Buffer
Combination serial-to-parallel, or parallel-to-serial interface converter in a single unit; low-power CMOS design derives power from serial connection, no power supply needed; supports 9,600 to 115,200 bps, DIP switch configurable

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SL or SLP — *10 Ports*

SL or SLP-256	with 256KB	$495
SL or SLP-512	with 512KB	$575
SL or SLP-1000	with 1MB	$675

Two Configurations – Ten Ports Each:
SL – four parallel and six serial ports
SLP – eight parallel and two serial ports
Both include 15 ft. serial null-modem cable

User Upgradable Memory:
From 256KB to 4MB buffer

Any Combination of Printers or PCs:
All ten SL or SLP ports can be software configured as either input or output.

Automatically Routes and Buffers Data:
Automatic switching and queuing of jobs; automatically converts data from parallel-to-serial or serial-to-parallel

115,200 bps PC-to-PC File Transfers:
Transfer files serially between PCs up to 115,200 bps; buffer serial data to the SL several times faster than normal 9,600 bps

Pop-up Menu via Hotkeys or Mouse:
Keyboard selection of printers and many other control functions; pop-up is for convenience, but is not required

Simple Installation:
Plug in your cables; if desired, run the installation software for the pop-up menu

Circle 215 on reader service card

Entry-Level Nets Pay Off

Users Like Simplicity, Lower Cost

NetWare's requirements were "mind-boggling," says RhoMed's Dan Swearingen, who chose an inexpensive network alternative.

Ever feel you're being persuaded to throw more technology at a problem than it warrants? That may well happen when you put together a local area network. Powerful net software like Novell's NetWare is well-suited to moderate-to-large installations, but for small organizations, it's like trying to swat a gnat with a sledgehammer.

Fortunately, other networking products allow a half dozen or so PCs to share files and printers quite adequately—and don't require a computer science degree for installation and maintenance. What's more, these net hardware/software combinations cost quite a bit less than full-featured systems. That has translated into substantial sales: Category leader Artisoft of Tucson, Arizona, claims more than 300,000 nodes.

Simpler Solutions

At RhoMed, a research and development firm in Albuquerque, New Mexico, ten PCs are linked over an *Invisible Net* LAN from Invisible Software, of Foster City, California. Scientists and attorneys run standard applications such as *WordPerfect* and *Paradox*, says Dan Swearingen, the company's controller, and this capability was essential. The network transmits data at rates of up to 3 million bits per second (Mbps) over twisted-pair cabling.

"With Novell, it was mind-boggling what we'd have had to get—a dedicated server, consultant, cards, and software," Swearingen says. "We were told it would cost about $10,000." In comparison, the company spent just $2500 on its *Invisible Net* LAN, he says.

The package was relatively easy to install, and it has been modified recently to be even easier, says Swearingen. Ongoing support is cheaper as well because the manufacturer doesn't charge for technical support. And the package doesn't require dedicating a PC as net server. "I'm really glad we don't have that kind of setup," he says now. "Ours is a lot more flexible."

In Phoenix, Cullen/Burr Associates Architects turned to *LANtastic* products, says Mike Montgomery, CAD manager. The company chose *LANtastic* for its slim memory usage and its manufacturer support. "Originally we had two CAD stations, and we wanted to be able to share the drawing files," Montgomery explains. The company now has seven PCs and runs applications such as *WordPerfect* over the network as well. With 2-Mbps adapters, the total came to less than $250 per PC.

"Of course you're making a trade-off for speed; we knew that going in," says Montgomery. The company's 200K to 300K drawing files transmit in about 15 seconds, which he says is acceptable.

SED Systems, a space engineering company in Saskatoon, Saskatchewan, Canada, employs *LANtastic* to allow its four secretaries to share word processing files. "We wanted a real quick system to network our secretarial staff," explains network coordinator Tom Dzubin.

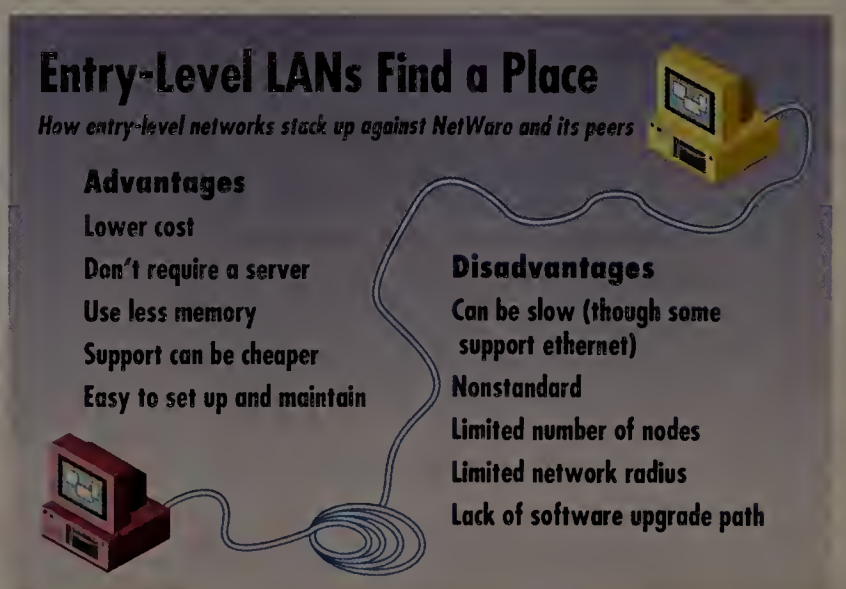
Dzubin confirms that *LANtastic* is "very inexpensive"; total cost with an Ethernet adapter was $300 per PC. The networks are also easy to set up. "It took me 15 minutes for the first two nodes and 3 minutes for the last nodes," he says. Performance is acceptable, according to Dzubin, with a 1MB file transmitted in about 15 seconds.

Net Disadvantages

Low-end networks may suffer from other drawbacks. Foremost among these, the nets generally don't scale well. Swearingen, for example, was told that Invisible Software doesn't recommend more than 15 PCs on a network. So if your network needs grow, you essentially must trash the network software and start over, though you may be able to keep the network adapters. *LANtastic*, however, lets you install multiple servers and connect nets via a hub.

For small organizations, these products can satisfy limited network requirements with a minimal investment of time and money. "What we like about [the small net] is, it's no more sophisticated than we are," explains Swearingen. *—Sharon Fisher*

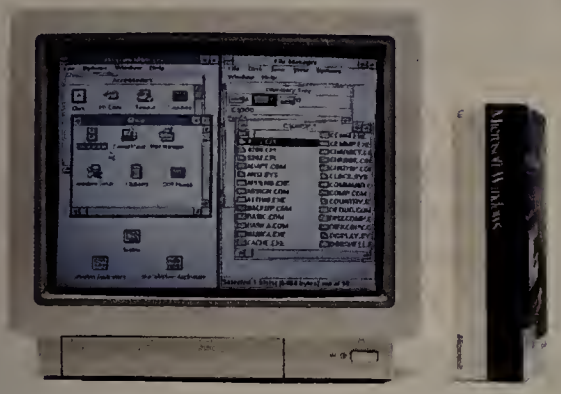
Sharon Fisher is a San Francisco–based freelance author, and Alice LaPlante is a Palo Alto, California, writer.



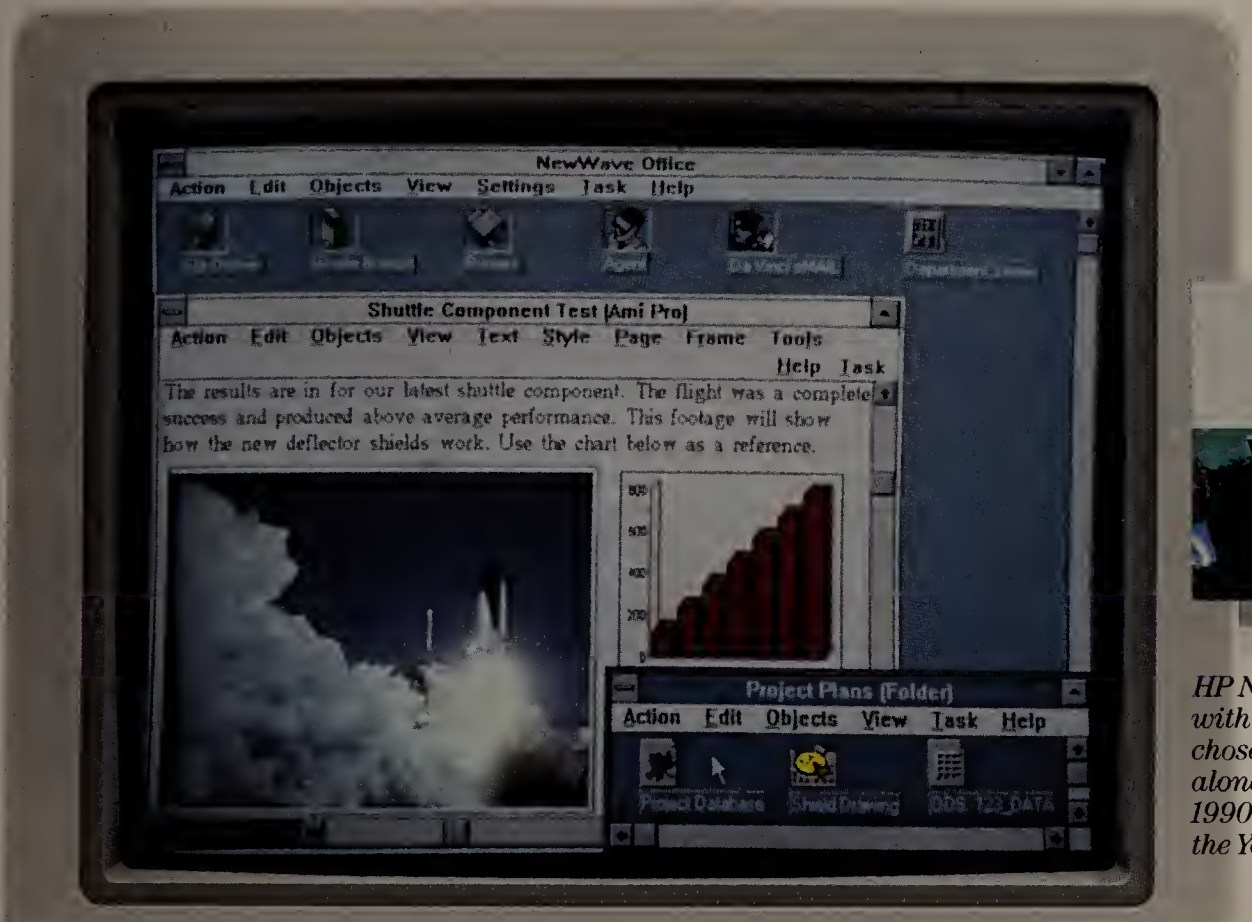
Local area network products that aim for ease of use and low cost, such as Artisoft's LANtastic, offer many benefits. Performance and upgrade paths, however, may be restricted.

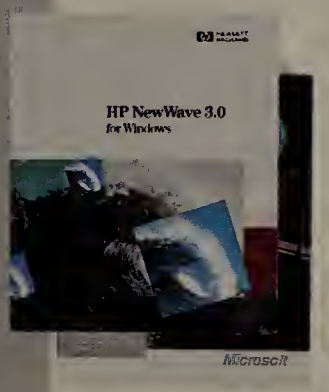
STEPHEN MARKS

You're one of millions who started with this vision of productivity...



...and are about to discover how to actually achieve it.





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The AST Premium II 486SX/20 and Zeos Notebook 286 were the most aggressively priced desktop and portable PCs during the current reporting period.

Best-Sellers

Leading PCs sold through traditional computer dealers

1. *IBM PS/2 Model 55 SX*
2. *IBM PS/2 Model 70 061, 121*
3. *NEC PowerMate SX*
4. *Compaq Deskpro 386s*
5. *IBM PS/2 Model 30/286*
6. *Compaq Deskpro 386s/20*
7. *Compaq LTE 386s/30*
8. *Compaq Deskpro 386n*
9. *Compaq Deskpro 386/20*
10. *Compaq LTE/286*

While IBM's PS/2 Model 55 SX kept its sales lead through the dealer channel, Compaq had six of the top ten, according to Storeboard/Computer Intelligence's latest survey.

BARGAINS OF THE MONTH

Over the Counter

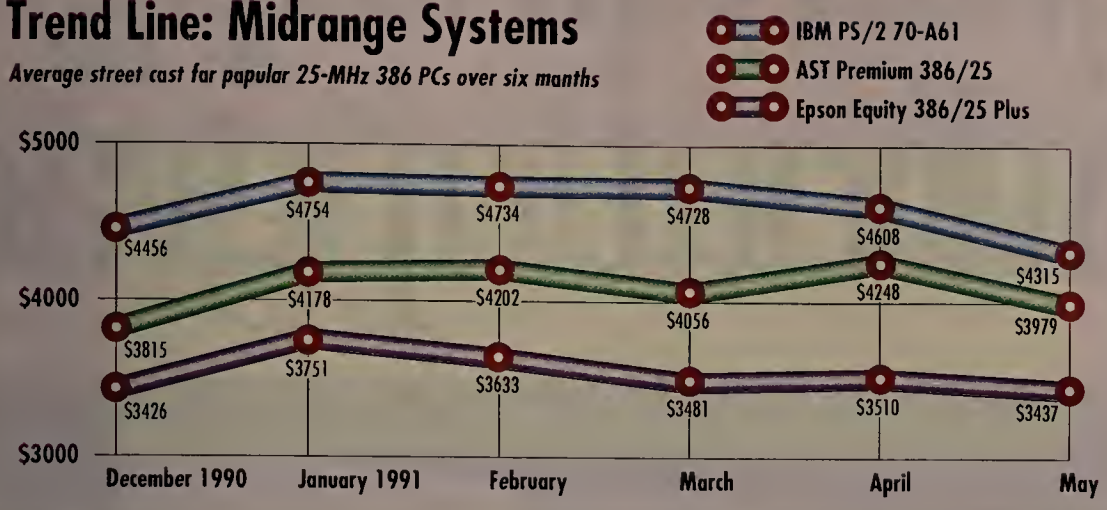
What you pay at retail for popular PCs

	Configuration				National					
	Speed (MHz)	RAM (MB)	Hard disk (MB)	Video adapter	List	Average	Low	Boston	Chicago	Dallas/ Ft. Worth
80386SX-based desktop PCs										
AST Bravo/386SX	16	2	40	VGA	$2845	$2153	$1699	$2178	$2097	$2157
Compaq Deskpro 386s	16	2	40	VGA	$2399	$1955	$1319	$1966	$1855	$1895
Compaq Deskpro 386s/20	20	2	60	VGA	$2899	$2367	$1829	$2389	$2337	$2218
Dell System 320 LX	20	1	40	VGA	$2100	$2100	$2100	$2100	$2100	$2100
Epson Equity 386SX/20 Plus	16	2	40	VGA	$3449	$2486	$1725	$2566	$2543	$2466
IBM PS/2 55 SX-061	16	2	60	VGA	$3295	$2415	$1648	$2449	$2322	$2323
NEC PowerMate SX/20	20	2	42	none	$2799	$1966	$1400	$1996	$2003	$1853
80386DX-based desktop PCs										
AST Premium 386/25	25	2	110	VGA	$5595	$3979	$2798	$4226	$4043	$4207
Compaq Deskpro 386/33L	33	4	120	VGA	$6199	$5066	$4339	$5111	$4998	$4742
Dell 333P	33	4	100	VGA	$3000	$3000	$3000	$3000	$3000	$3000
Epson Equity 386/25 Plus	25	2	100	VGA	$4999	$3437	$2500	$3692	$3443	$3059
IBM PS/2 70-A61	25	2	60	VGA	$5845	$4315	$2922	$3876	$4282	$4121
Tandon 386/33	33	4	110	VGA	$3279	$3279	$3279	$3279	$3279	$3279
Tandy 4033 LX	33	2	105	VGA	$5898	$5898	$5898	$5898	$5898	$5898
80486SX-based desktop PCs										
ALR BusinessVEISA	20	1	80	none	$3495	$2807	$1749	n/a[1]	$2425	n/a[1]
AST Premium II 486SX/20	20	4	80	VGA	$3695	$2932	$2586	$2818	$3018	$2864
IBM PS/2 90XP-OG5	20	4	80	XGA	$8345	$6375	$4172	$6259	$6649	$6204
80486DX-based desktop PCs										
AST Premium 486/25E	25	4	110	VGA	$8595	$6273	$4499	$6735	$6131	$6441
Compaq Deskpro 486/33L	33	4	120	VGA	$10,099	$8172	$5500	$8240	$8290	$7726
IBM PS/2 95 XP	33	4	320	XGA	$16,445	$12,187	$8222	$11,560	$12,736	$11,594
NEC PowerMate 486/25E	25	4	140	none	$9899	$6912	$4950	$7031	$6809	$6967
Portables/laptops										
Compaq LTE/286	12	640K	20	CGA-LCD	$2499	$2068	$1749	$2042	$2004	$1941
Compaq LTE 386s/20	20	2	30	VGA-LCD	$4399	$3581	$3079	$3598	$3585	$3416
Dell 320LT	20	2	40	VGA-LCD	$3299	$3299	$3299	$3299	$3299	$3299
Epson Equity LT-386SX	16	2	40	VGA-LCD	$4998	$3311	$2499	$3453	$3326	$3168
IBM PS/2 L40 SX	20	2	60	VGA-LCD	$5995	$4485	$2998	$4440	$4469	$4336
NEC ProSpeed 286	16	1	20	VGA-LCD	$3899	$2882	$1949	$2843	$2795	$2787
Toshiba T1200XE	12	1	20	CGA-LCD	$2299	$2149	$1698	$2307	$2290	$2027
Toshiba T2000SX	16	1	40	VGA-LCD	$3749	$3642	$2750	$3599	$3896	$3179
Zeos Notebook 286	12	1	20	VGA-LCD	$1995	$1995	$1995	$1995	$1995	$1995

From on IDC survey af mare than 180 computer dealers in eight metrapolitan areas. Figures based an at least faur price quates far each machine. Prices are based an manufacturer's standard canfiguratian without manitar. [1]IDC was unable ta callect enaugh price quotes for this model in this metrapolitan area due ta limited dealer caverage.

Trend Line: Midrange Systems

Average street cast far papular 25-MHz 386 PCs over six manths



System prices typically vary widely with the buying season. After rising and falling erratically this winter, prices in the popular 25-MHz 386 PC category finally succumbed this spring to strong downward pressure brought on by weak demand and increasingly discriminating buyers. What the numbers don't reveal are additional system enchancements that are being included for the same price.

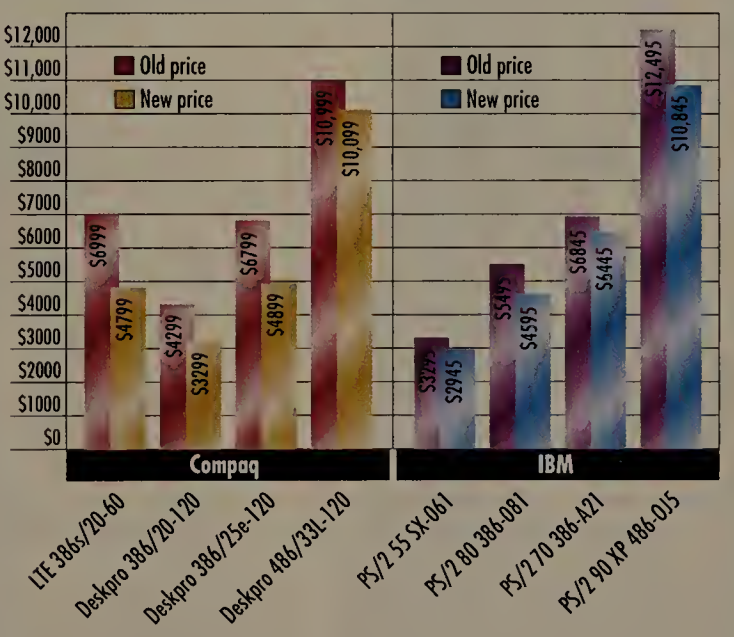
Metropolitan	Los Angeles	Miami/ Ft. Lauderdale	New York	San Francisco Bay Area	Washington, D.C.
	$2032	$1991	$2200	$2276	$2101
	$1917	$1888	$1965	$2025	$1980
	$2378	$2266	$2372	$2457	$2374
	$2100	$2100	$2100	$2100	$2100
	$2299	$2359	$2398	n/a[1]	$2712
	$2367	$2478	$2404	$2382	$2569
	$1736	$2179	$1851	n/a[1]	$2114
	$3222	$3916	$4128	$3873	$3813
	$5069	$4877	$5151	$4763	$5144
	$3000	$3000	$3000	$3000	$3000
	$3323	$3183	$3473	n/a[1]	$3378
	$4099	$4450	$4421	$4364	$4664
	$3279	$3279	$3279	$3279	$3279
	$5898	$5898	$5898	$5898	$5898
	$2571	n/a[1]	$3070	n/a[1]	$2940
	$2870	n/a[1]	$2978	$2771	$3030
	$5831	$6315	$6647	$6259	$5831
	$5033	$6016	$6206	$6315	$6329
	$7876	$7742	$8150	$8035	$8427
	$11,547	$12,193	$12,164	$12,334	$13,090
	$6138	$7060	$5971	n/a[1]	$7314
	$2142	$1984	$2077	$2130	$2042
	$3587	$3439	$3627	$3652	$3587
	$3299	$3299	$3299	$3299	$3299
	$3198	$3249	$3390	n/a[1]	$3359
	$4162	$4563	$4532	$4891	$4796
	$2417	$3113	$2890	n/a[1]	$3061
	$2083	$2216	$2068	$2037	$2309
	$3704	$3729	$3400	$3423	$4374
	$1995	$1995	$1995	$1995	$1995

PC Futures: Price Push Comes to Shove

AST's Premium II 486SX/20 debuted at a strikingly low price in May and is the desktop Bargain of the Month[2], while Zeos's Notebook 286 garnered portable PC Bargain of the Month honors. IBM's veteran PS/2 Model 55 SX continued to reign on the best-seller charts, although Compaq held more of the top ten slots. Price continues to drop throughout the industry. IBM slashed prices as much as 38 percent during its second round of cuts within a month, and many other vendors followed suit. For example, the base price on Compaq's Deskpro 386s dropped 20 percent, and street pricing fell 19 percent; IBM cut list price 11 percent on the PS/2 Model 55 SX-061, and street pricing slid 8 percent. Prices on 386 machines should be whittled further as models built around Intel's new 486SX chip ship in volume. Vendors will continue to feel strong pricing pressure during the rest of the year as market growth remains slow.

Compaq, IBM Slash Prices

List prices an selected madels before and after cuts



The two leading PC suppliers cut prices substantially this spring, and dozens of other manufacturers followed suit.

[2] Bargains of the Manth are determined by adjusting prices an PCs af a given class far standard memary and starage, then finding which PC campares best.

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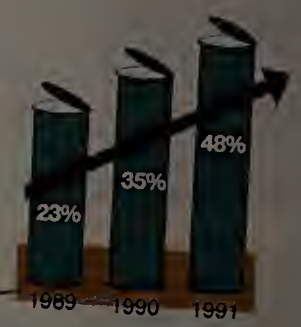
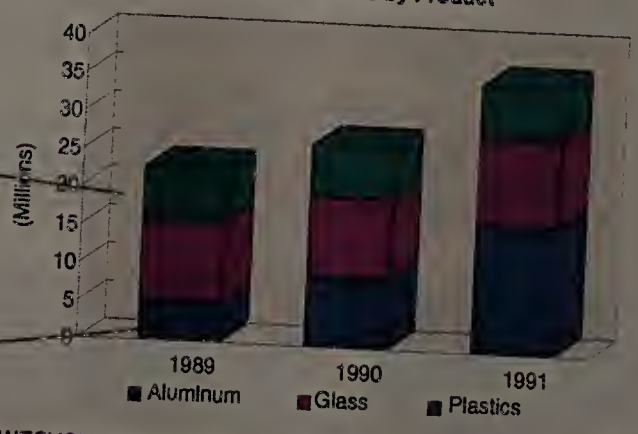


This study conducted by the Materials Research Group provides the basis for our most recent recommendation that WeCycle continue to expand its aluminum recycling capacity by another 70% over the next 6 years. The graph to the right shows the increasing proportion of our business provided by the aluminum division during the past three years, now approximately half of all revenues. It is our opinion that, at this rate of growth, aluminum recycling will continue to offer our company its greatest opportunity for expansion over the next decade, and certainly into the 21st century.



WECYCLE PRODUCT	1989	1990	1991
Aluminum			
East	2,323,426	4,019,527	7,315,539
Central	1,372,347	2,374,160	4,320,972
West	1,726,492	2,986,831	5,436,033
Total	5,422,265	9,380,518	17,072,544
Glass			
East	2,496,721	2,567,821	2,798,925
Central	3,598,757	3,217,693	3,507,285
West	4,217,635	4,471,294	4,873,710
Total	10,313,113	10,256,808	11,179,920
Plastics			
East	2,897,493	3,171,243	3,234,668
Central	1,873,938	1,823,697	1,860,171
West	2,378,942	1,967,421	2,006,769
Total	7,150,373	6,962,361	7,101,608

Glass and Plastics

As can be inferred from the graph to the left, glass and plastics recycling has been holding steady throughout this same period, and has consequently become a smaller proportion of our overall sources of revenue.

Although this group would strongly recommend that WeCycle Waste Corporation do all that is necessary to increase its activities in these areas, our studies have shown that aluminum will become increasingly the material of choice in the shipping, heavy manufacturing and container industries.

Aluminum

It is our opinion that sources of aluminum products will be pressed close to their limits over the next decade.

Therefore, we propose that WeCycle Waste Corporation invest in more aluminum capacity during the next five years in order to take the best advantage of this increasing market demand.

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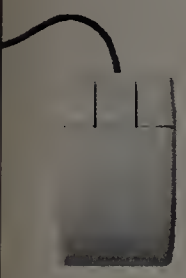
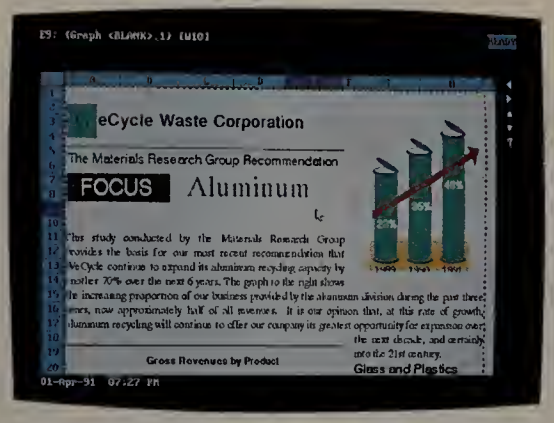
For starters, it's not just a graphical spreadsheet. It's a fast, graphical spreadsheet for DOS. It's easy to use. And it works as well on an older XT with just 512K of memory as it does on the newest 486 machine.



It also shares many features in common with our powerful 3D spreadsheet 1-2-3, Release 3.1. Including its superb spreadsheet formatting and publishing capabilities and full mouse support. Along with its popular Auto Compress feature that gives you a trouble-free way of making larger worksheets print on a single page.

We've also added new features you won't find in other spreadsheets. Like



With its WYSIWYG graphical environment, you can do all your formatting "live" on screen.

the Viewer (based on Lotus Magellan® technology) which lets you view files before retrieving them and makes file linking as easy as point and click. And a very helpful Auditor that simplifies the job of documenting and analyzing worksheet logic.

Of course, you won't just like what Release 2.3 does. You'll like how it feels. It's quick and smooth. With a WYSIWYG (what-you-see-is-what-you-get) graphical environment that lets you format text, data, and graphics "live" on screen. With the mouse, you can execute commands, highlight cells or ranges, open dialog boxes, place and size graphs, change type styles, fonts and point sizes. All with unparalleled speed and ease.

Lotus 1-2-3 Release 2.3 runs smoothly and quickly no matter what hardware you're running it on.

What's more, Release 2.3 gives you a wide range of printing and reporting capabilities. Including the capacity to place as many live graphs on a worksheet as you'd like.

Along with 96 type style combinations, drop shadows, new 3D-effect graphs, drawing and annotation tools, and the most font support, choices of colors and shading available.

Compatibility? As with any 1-2-3 product, it's no problem. Because Release 2.3 will read all of the files you've created on previous versions of 1-2-3, including files you've formatted using Allways™ and Impress.™ So you'll preserve all your work, as well as your training.

For more information see your Lotus Authorized Reseller. For a free demo or to order your upgrade directly from Lotus* call **1-800-TRADE-UP, ext. 6002.**

What's New In Lotus 1-2-3 Release 2.3.

- A WYSIWYG graphical environment with live on-screen formatting
- Lotus Magellan viewer technology for fast file previewing, retrieving and linking...all without leaving your active worksheet.
- More graph types, including 3D-effect graphs and graph annotation capabilities.
- Auto Compress, for a trouble-free way of making larger worksheets print on single page
- Dialog Boxes for an easier, more interactive way of working
- Text-editing for easy on-sheet word processing, including automatic word wrap, even around graphs
- The Auditor for documenting or highlighting your spreadsheet logic
- Improved memory management for building larger worksheets up to 12 MB in size
- New printer drivers that support all leading laser and dot-matrix printers
- Context-sensitive, interactive Help and an on-line tutorial

**Please have your credit card and product package ready when you call. In Canada, call 1-800-668-1509.*

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The new Lotus 1-2-3 for DOS

Lotus

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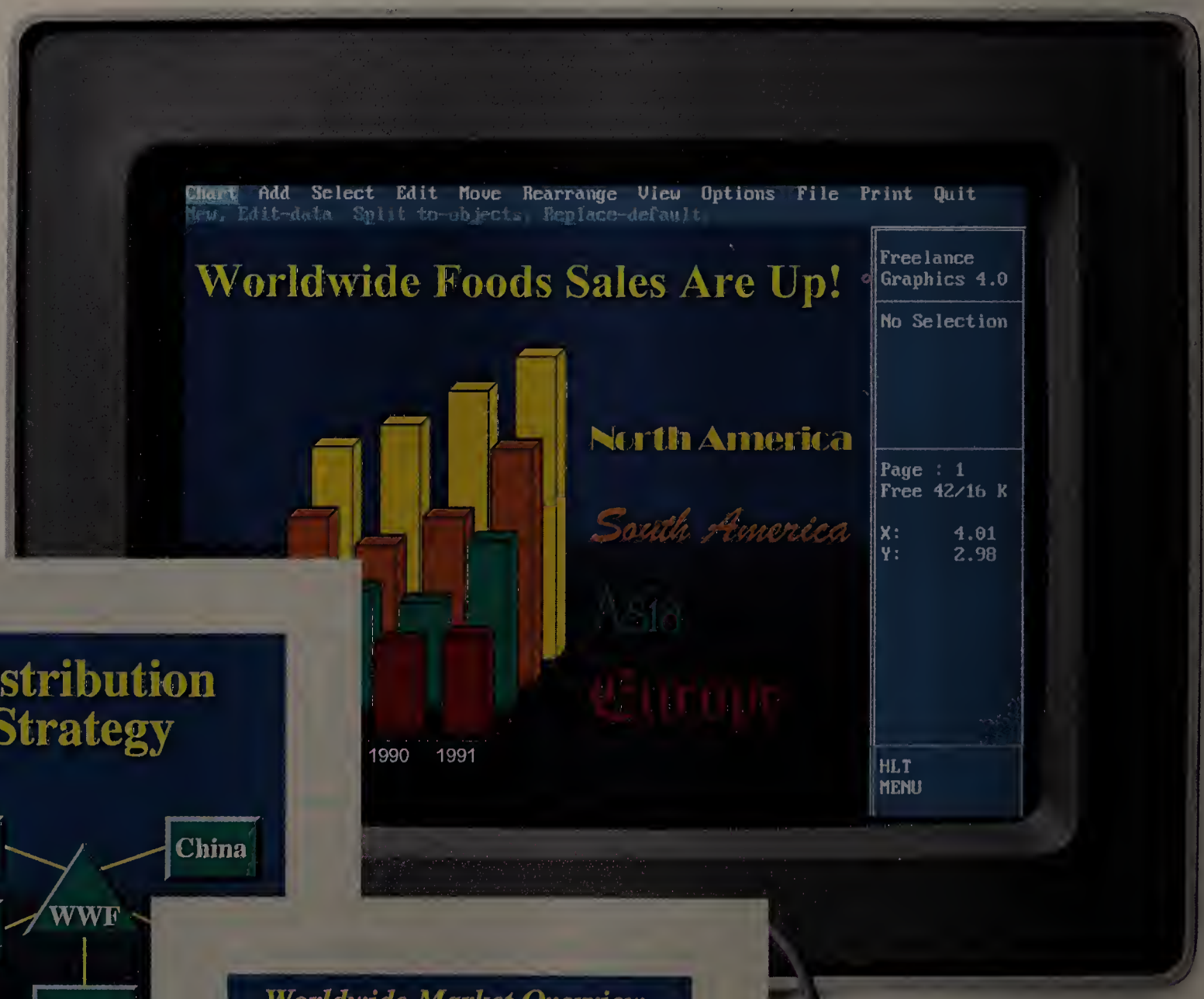
It will create your next
Not to mention



Automated Smart Features *make it easier than ever to produce everything from simple word charts to impressive flow charts, diagrams and other business drawings.*

The new Freelance Graphics for DOS offers a WYSIWYG (what-you-see-is-what-you-get) environment where you work with actual colors and fonts while you're creating your graphics. And with the mouse you can do it all in record time.

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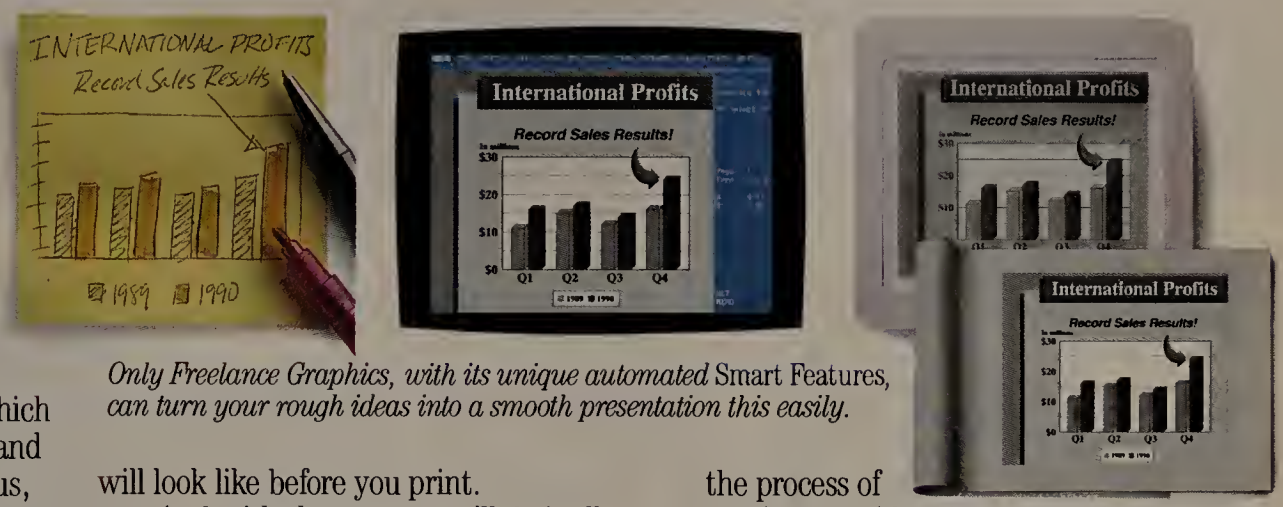
Freelance Graphics. presentation beautifully. automatically.

Now there's an even better version of Freelance® Plus, the award-winning graphics program praised by *PC Magazine, PC World* and *Software Digest.* It's so improved, in fact, we even changed its name. Introducing Freelance Graphics™ 4.0. The best presentation graphics program for DOS.

For starters, we've added a graphical WYSIWYG environment. Which means you'll work with actual colors and fonts while creating your graphics. Plus, you'll know what your output will look like before you print.



Only Freelance Graphics, with its unique automated Smart Features, *can turn your rough ideas into a smooth presentation this easily.*

Software Digest ★★★★ Four star award

For two consecutive years, Software Digest *awarded Freelance Plus its highest-rating. Now with Freelance Graphics, we've made the best even better.*

And with the mouse you'll do it all—from executing menu commands to moving a chart—in record time.

Yet what's really unique about the new Freelance Graphics is its *Smart Features.* Unlike other DOS graphics programs, its hard-working *Smart Features* automate the process of turning your ideas into persuasive presentations. So while you're concentrating on what you want to say, Freelance Graphics will take care of how it looks. Whether you're creating slides, overheads, or hard copy, in color or black-and-white.

Here are a few of its *Smart Features:* Portfolio, a built-in presentation manager, helps you organize and prepare your presentation; a Text Chart Outliner,[1] complete with a spell-checker, creates stacks of text charts in seconds; Auto-charting makes weekly or monthly reporting a snap by printing hundreds of up-to-date charts with a single command; Smart Chart Update automatically recomposes a chart whenever the data changes... even if you've added annotations or symbols; and over 1,000 Pre-drawn Symbols and Design Backgrounds.

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The new Freelance Graphics.

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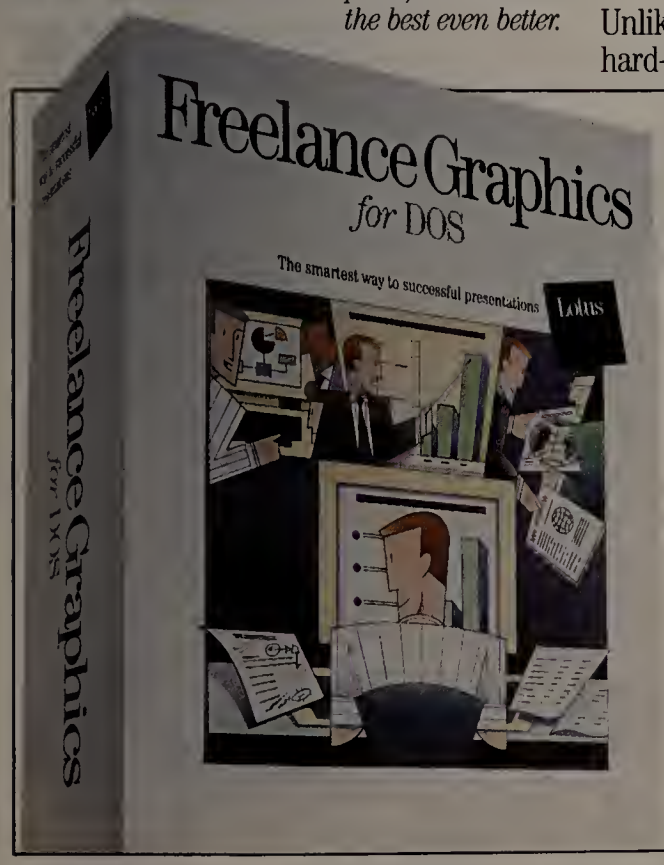

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[1]Developed by Symantec Corporation, especially for Freelance Graphics. [2]Offer expires September 30, 1991, after which the Lotus direct upgrade price will be $119. [3]Eligible products for upgrade offer include all versions of the following products: Lotus Freelance Plus or Graphwriter, Harvard Graphics, DrawPerfect, Applause II/Draw Applause, Graph Plus, Charisma, Microsoft Chart, Pixie, Gem Series, ChartMaster, Diagram Master. [4]Freelance Graphics Upgrade also available at participating Lotus resellers.

Freelance Graphics for DOS Lotus

EXPERIENCE

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Windows Management System

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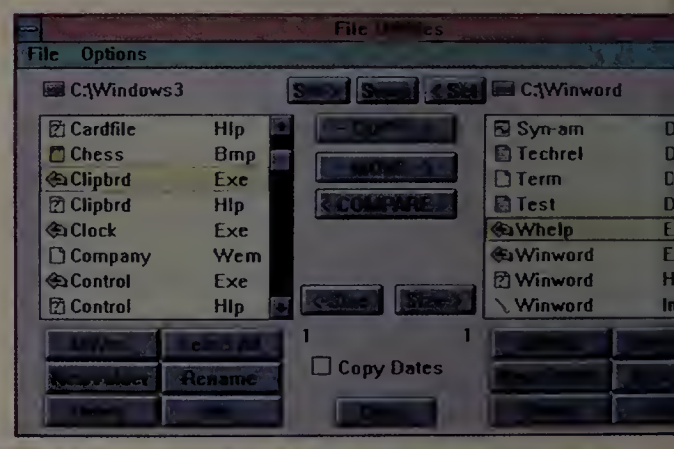
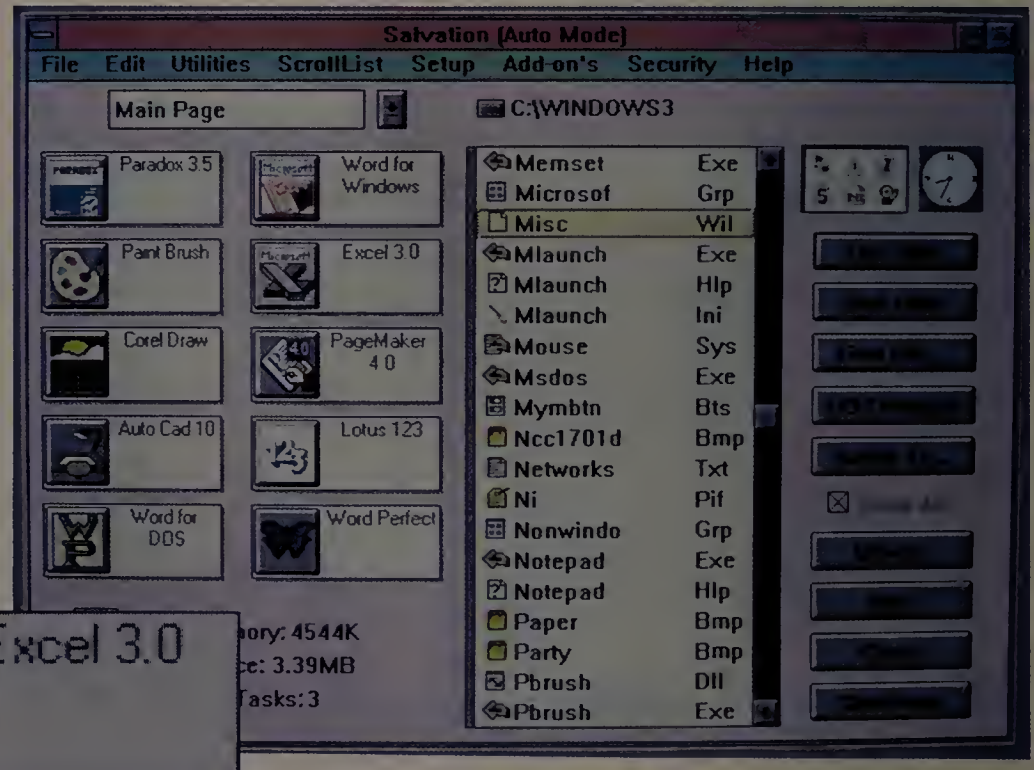
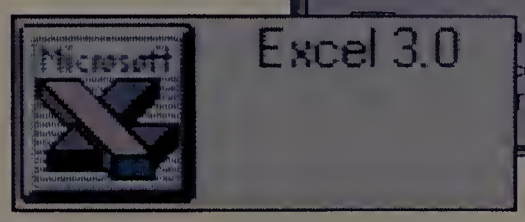


Salvation is the friendliest graphic user interface (GUI) available to Windows users. Replace and integrate most Windows file utilities with Salvation.

Salvation's exclusive BUTTON LAUNCHERS™ offers the ability to easily launch either Windows or DOS applications. You automatically or manually program BUTTON LAUNCHERS™ and add your own personal icon.





Salvation file utilities makes management of all your disks a simple task. You can move copy, delete, rename, or easily create both files and subdirectories. In addition to launching, Salvation automatically handles text and graphics files. Salvation even provides security access to your files.

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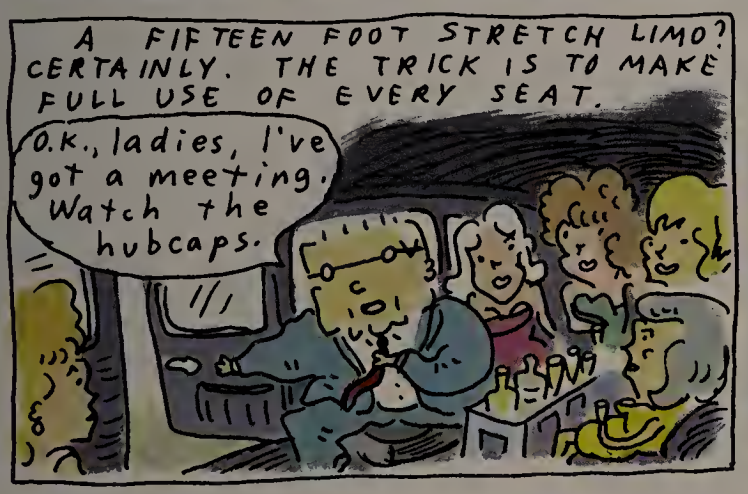

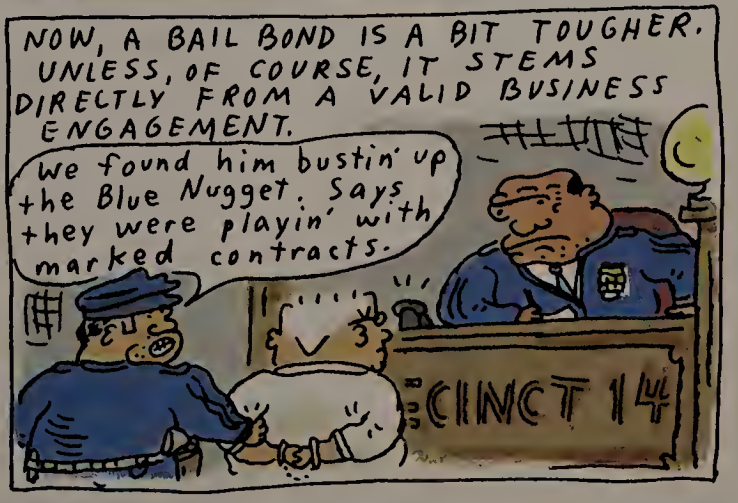

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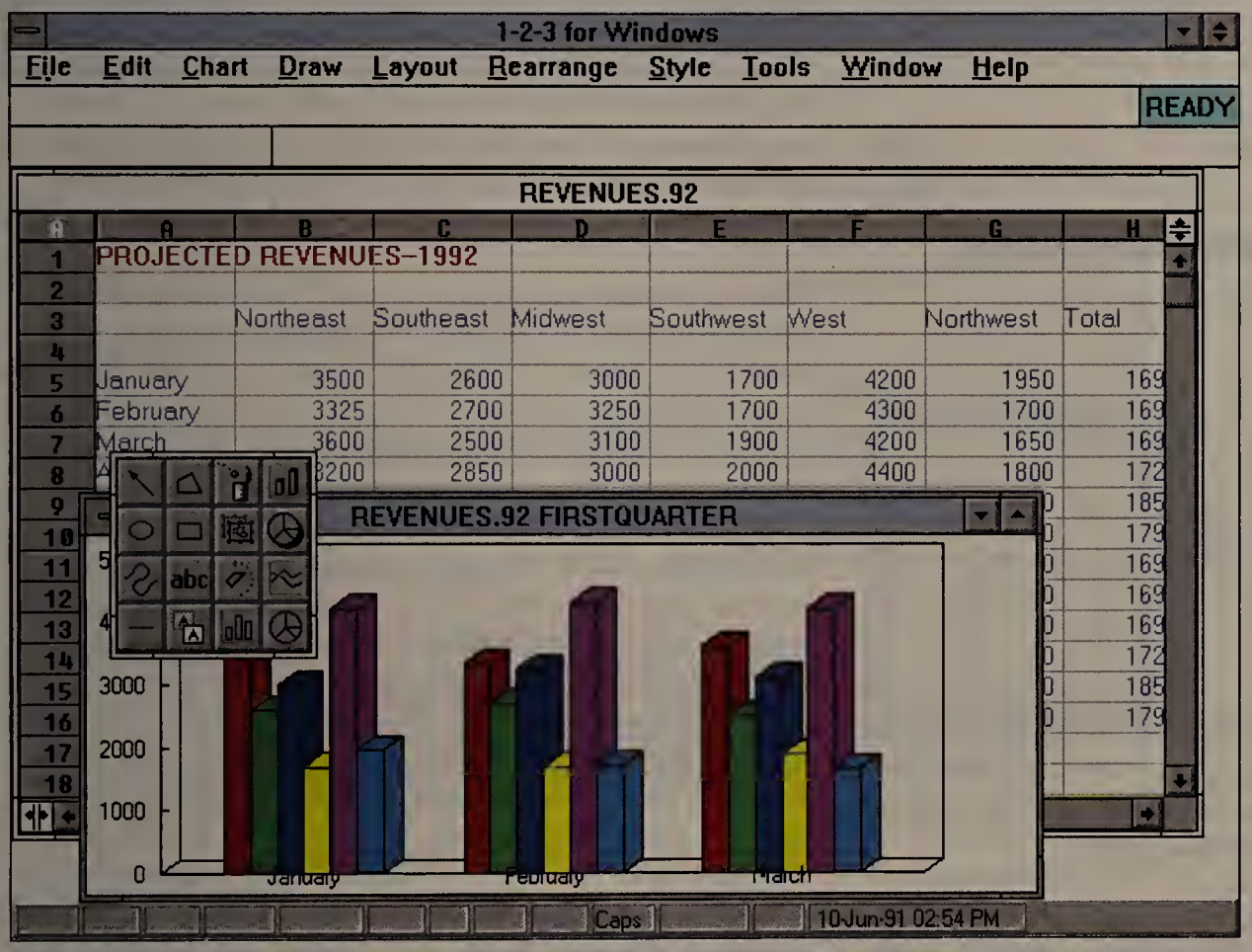
1-2-3 Does Windows

Lotus steps into a Windows world of supremely useful icons and stunning output while lending a helping hand to current 1-2-3 users.



You want graphics? Picture this: 1-2-3 for Windows helps you enliven reports and presentations with a variety of graph types plus drawing and text features.

Richard Scoville

COVER STORY

In the past year, *Windows* has sold millions of copies, but many users' number one *Windows* application is still Solitaire. Despite the availability of many other excellent *Windows*–based applications, such as Microsoft's *Excel 3.0*, most buyers have been patiently waiting for the other shoe to drop before they make their next move.

Well listen up, folks—Lotus just dropped one. And it's a real beaut.

1-2-3 for Windows packs the formidable power of *1-2-3* release 3.1+—including 3-D worksheets, high-end data management, and a nonlinear solver—into a unique version of the *Windows* interface ablaze with icons. You can create polished output easily, thanks to full-featured business graphics and scalable fonts. And the environment provides a continuous view of the final product as you work.

Does the new *Windows* interface mean you're in for another trip to the training center? Not at all: When you hit the slash key, up pops a free-floating box with the familiar 1-2-3 Classic menus inside. Until you're comfortable with the new system, you can keep on working the old way—and the Classic menus promise 100 percent macro compatibility with previous releases.

Icons to Suit Your Taste

The optional Classic menu is a great idea, but most users will soon want to move on to the picturesque new world of *1-2-3/W*'s icon palette—a set of 70 3-D mouse buttons that execute a variety of common commands. Like *Excel 3.0*'s tool bar, the palette lets you quickly justify text, format cells, make a graph, and sum data. But it contains a host of other shortcuts that sort tables, traverse worksheets, copy and move data, preview reports, and much more. You needn't display all 70 icons—select only a handful, if you want.

Unlike *Excel*'s tool bar, *1-2-3/W*'s rectangular palette floats—you can place it anywhere on the screen and resize it any way you like. This is

SNAPSHOT

1-2-3 for Windows

WINDOWS The Windows version of the most popular spreadsheet of all time offers Classic menus to lure current 1-2-3 users and an innovative icon palette that you can configure to your taste.

KEY FEATURES

- **Customizable icon palette**
- **Optional Classic menus**
- **Nonlinear solver**
- **3-D worksheets**
- **Full-featured business graphics**
- **Adobe Type Manager included**

AVAILABILITY

Late summer

PRICING

$595; upgrode from 1-2-3, Excel, ond Quattro Pro $150

Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA 02142
800/343-5414,
617/577-8500

Reader service no. 773

clearly the state of the art in icons.

You can even build your own icons and attach custom macros or C programs to them. Developers can store icon palettes in named files and link multiple palettes into a custom interface, putting custom tools and applications gently into the hands of occasional users.

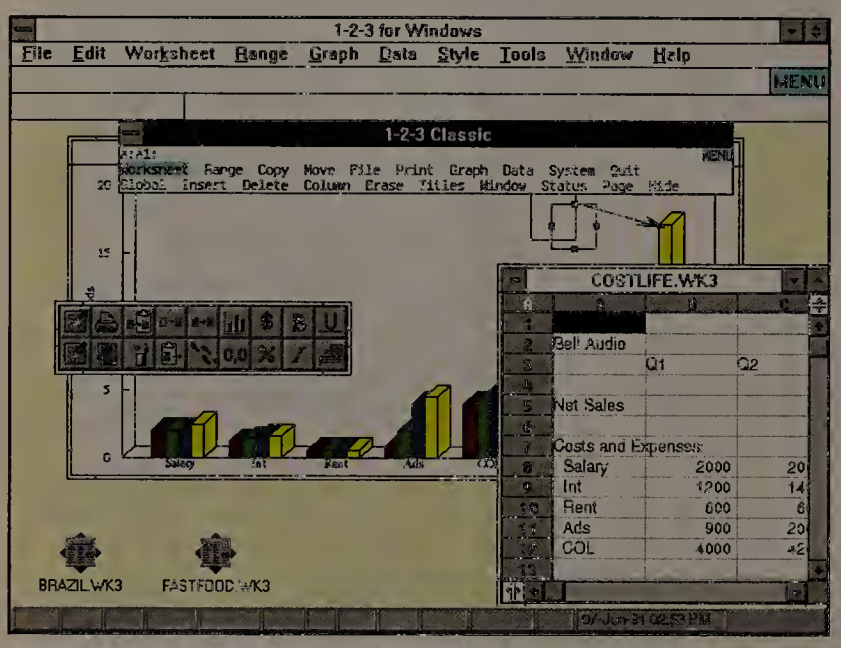
Cutting Back the Menu Tree

The endlessly branching menu system of release 2.3 and 3.1+ has been (mercifully) pruned into a manageable set of pull-down menus and well-designed dialog boxes. The result is faster access to controls—for example, the nine-level menu sequence for search and replace is replaced by a single dialog box containing four fields.

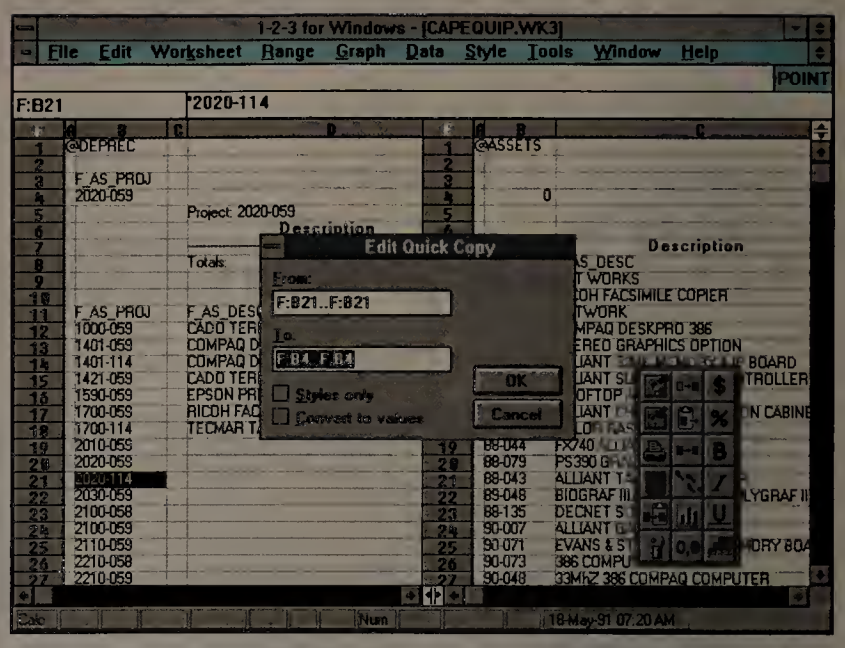
To maintain continuity with its DOS forebears, *1-2-3/W* puts a slight spin on the *Windows* interface. In some cases, the offspring manifests a hybrid vigor. For instance, the printing system is now sensibly organized into standard Page Setup and Print dialog boxes, but *1-2-3*'s old /Print system retains an independent, ghostly existence in the Classic menus, complete with named reports and setup strings. This is good news for application developers who need to produce multirange data base reports—the flexibility of the old system makes it much easier to automate these complex print jobs.

Range selection in *1-2-3/W* is somewhat more flexible than in *Excel*. As in *Excel*, you can preselect a range before executing a command, but you can also change your selection freely from inside a dialog box—the dialog boxes magically dissolve and reappear as you click on the spreadsheet to make a range selection.

In other cases, *1-2-3/W*'s *Windows* translations are less fluent. There's no intuitive way to select a 3-D range with the mouse: You must start with a 2-D range, then reach for the keyboard or click on an icon to shift into the next page. Also, to apply a style (a named collection of format features) to a range, you select it from the Style menu, but you must remember to clear it from a separate Edit Style menu.



1-2-3 for Windows' optional Classic menus will save thousands of loyal 1-2-3 users countless hours of retraining. When they're ready, they can move on to the new icon palette.



1-2-3 for Windows' slick new icons are the crown jewels of the new interface. You get 70 to choose from, each of which executes a frequently used command, and you can assemble your own icon palette and position it anywhere on screen.

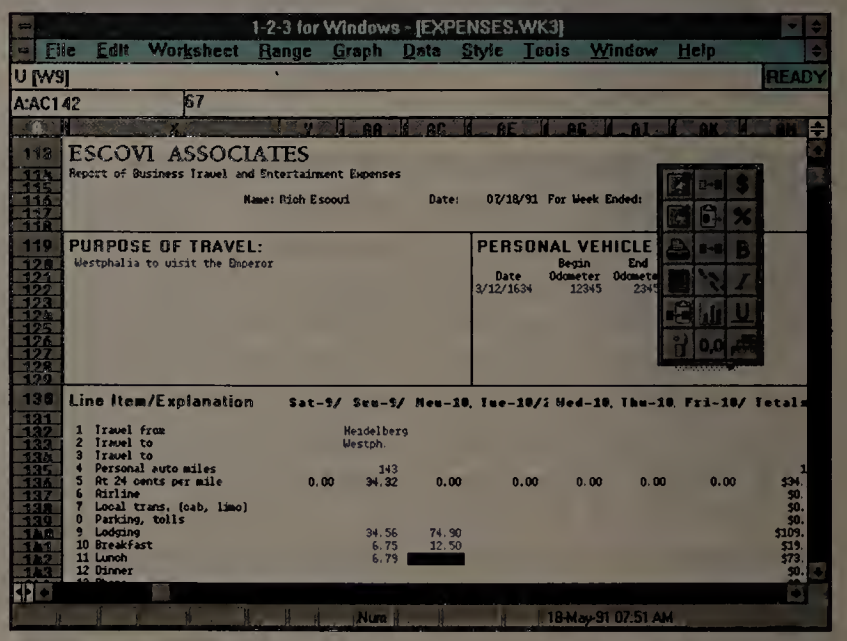
A Good Family Member

Except for the icon palette and a few *Windows*-specific features, *1-2-3/W* offers few functional innovations above and beyond release 3.1+. The good news is that release 3.1+ is a very capable program, and *1-2-3/W* matches it step for step.

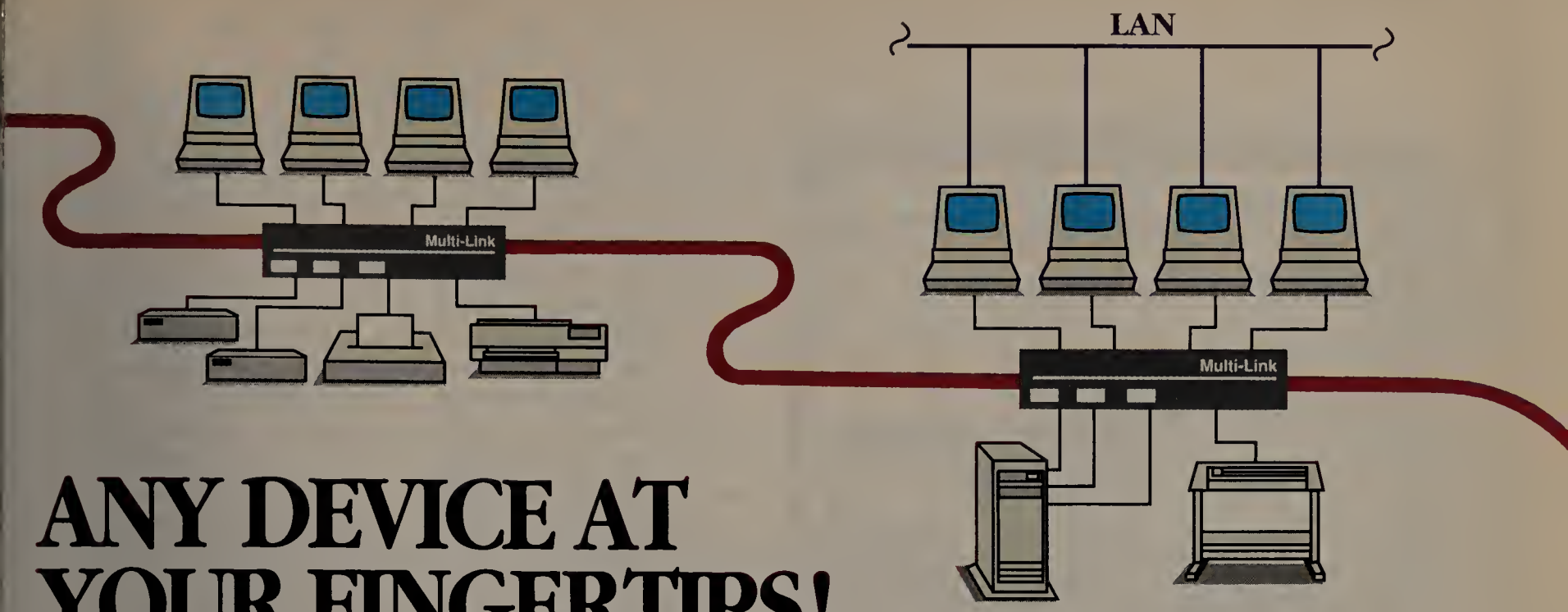
For starters, *1-2-3/W* offers the nonlinear solver. This superb analytical tool lets you work backward from a projected outcome to quickly find optimal solutions. For example, the solver could help you find the biggest profit projection in a range of marketing strategies.

1-2-3/W also shares *3.1+*'s relational data base management and external data links, which make it simpler for developers and power users to organize raw data from reports. A 3-D work space lets you divide a large worksheet into separate pages for easier handling. For developers, the macro language includes new commands to manipulate windows, manage the Clipboard, and establish Dynamic Data Exchange (DDE) links with other *Windows* applications.

1-2-3/W makes it easy to create great output. You can dress up reports with scalable fonts, thanks to the bundled *Adobe Type Manager*. And you can format your reports



Will the boss approve that whopper of an expense report? With 1-2-3 for Windows, it's easy to use fonts and other formatting refinements to create persuasive documents.



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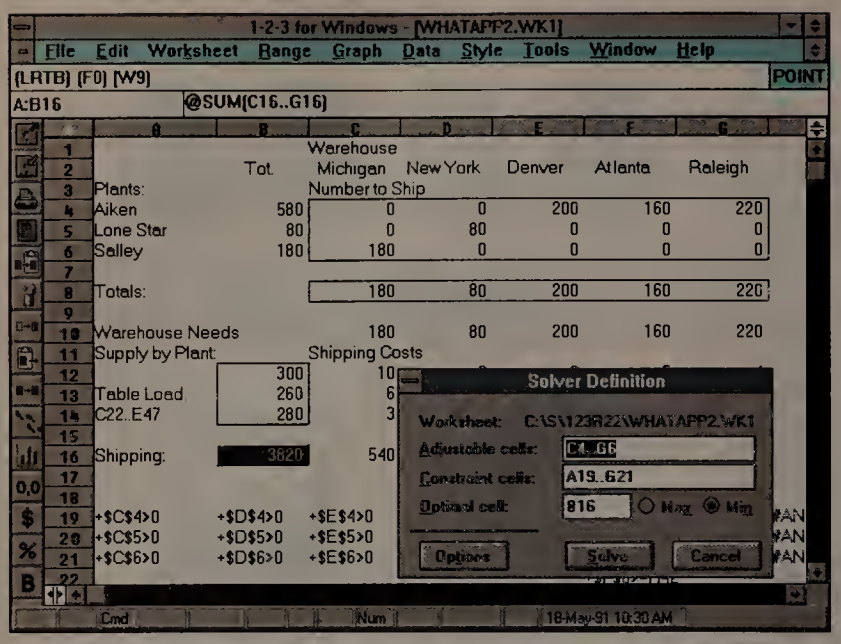

1-2-3 for Windows includes every feature found in 1-2-3 3.1+, including the superb new nonlinear solver. With this tool, you can work your way backward through analytical puzzles, propose various solutions, and find out how they affect variables.

quickly by creating styles and attaching them to new ranges.

Need graphics? You can create a variety of charts—from pies to bars to mixed line-and-bar graphs—and even add 3-D effects. A gallery of chart styles, similar to *Excel*'s, helps you choose the best graph for your data. A separate module (with an interface similar to Lotus's *Freelance*) enables you to add lines, arrows, and text to worksheets and charts.

Which 1-2-3 for You?

If you've already upgraded to *1-2-3 3.1+* or even *2.3*, switching to *1-2-3/W* may seem unnecessary. After all, the lion's share of *1-2-3 for Windows*' features—including graphics, scalable fonts, and continuous page preview—have already appeared in *3.1+* and *2.3*.

No matter. If you have the hardware to handle *Windows* (a 386SX or better), switching to *1-2-3 for Windows* is definitely worthwhile. The DOS versions of *1-2-3* have many of the same features, but after years of revisions, the old interface is beginning to collapse under its own weight. Even WYSIWYG releases 2.3 and 3.1—lacking scroll bars, radio buttons, and other convenient tools—are far less elegant than *1-2-3/W*. *1-2-3 for Windows* superbly illustrates the principle that features alone don't make an excellent program—it's how easy those features are to use.

Easy access to spreadsheet power isn't the only benefit. Once you learn *1-2-3 for Windows*, you'll find learning other hot *Windows* applications like *Ami Pro* or *Word for Windows* much more intuitive. You'll also benefit from easy font manipulation, superb printer support, multitasking, and automatic data transfers between *Windows* applications that use DDE.

If you're still wary of taking the *Windows* plunge, remember that *1-2-3 for Windows* won't immerse you in a sea of pulldown menus and radio buttons before you're ready. Just hit that slash key, and you're back on familiar ground.

One-on-One with Excel

1-2-3 for Windows is a step ahead of the DOS *1-2-3*s, but what about its new *Windows* rival, *Excel?* Both packages target the same broad audience—including management users and high-end analysts and developers.

Despite *1-2-3/W*'s innovative icon palette, its interface can't quite match *Excel*'s smooth, intuitive personality. For example, with *Excel 3.0*, you can double-click on almost any worksheet element—a formula, say, or a graph item—and the dialog box that controls it appears, ready to edit. With *1-2-3/W*—and every other program in existence—you must go to an icon or menu to open the box.

But mostly it's a lot of little things *Excel* does that make the difference. For example, *1-2-3 for Windows* lacks *Excel*'s ability to let you preselect a group of columns and set their width with the mouse. And it can't consolidate multiple worksheets automatically or save them as a group. All these niceties add up to increased productivity.

That Ol' Slash-Key Religion

But ultimately, many *1-2-3* users making the inevitable switch to *Windows* couldn't care less how good *Excel* is. It doesn't offer *1-2-3/W*'s slash-key training wheels; end of story. For these people, the optional Classic menu box will be worth more than all *Excel*'s shortcuts.

Where does that leave *3.1+?* With hardware requirements almost as high as *1-2-3/W*'s—and a similar feature set—it provides little reason to keep power users from moving on to *Windows*' smoother interface. Release 3.1+'s only advantage is a small potential speed advantage over *1-2-3/W*. Release 2.3, on the other hand, seems a good alternative—along with *Quattro Pro*—for users without the hardware to handle *Windows*.

1-2-3 for Windows is a major step forward for *1-2-3* users. Soon, *1-2-3 for Windows* will replace Solitaire as the mission-critical application for thousands of new *Windows* converts.

Richard Scoville is a contributing editor for PC World.

POWER TIP NO. 197

Fine-Tuning Crosstalk's VT100 Emulation

When communicating with a VAX host using VT100 terminal emulation, you'll find that *Crosstalk*'s remapping of the PC's keyboard is somewhat flawed. VT100 users normally press <Backspace> to send a delete character and <Ctrl>-<Backspace> to send a backspace character. But *Crosstalk*'s emulator maps these keys in just the opposite way.

You can easily reverse these key assignments and set *Crosstalk* straight. At *Crosstalk*'s command line, type **FK 1 ^H**, press <**Enter**>, type **save**, and press <**Enter**>. When prompted, type the name of the XTK parameter file for the system you'll be calling.

Judy Heim
Contributing Editor

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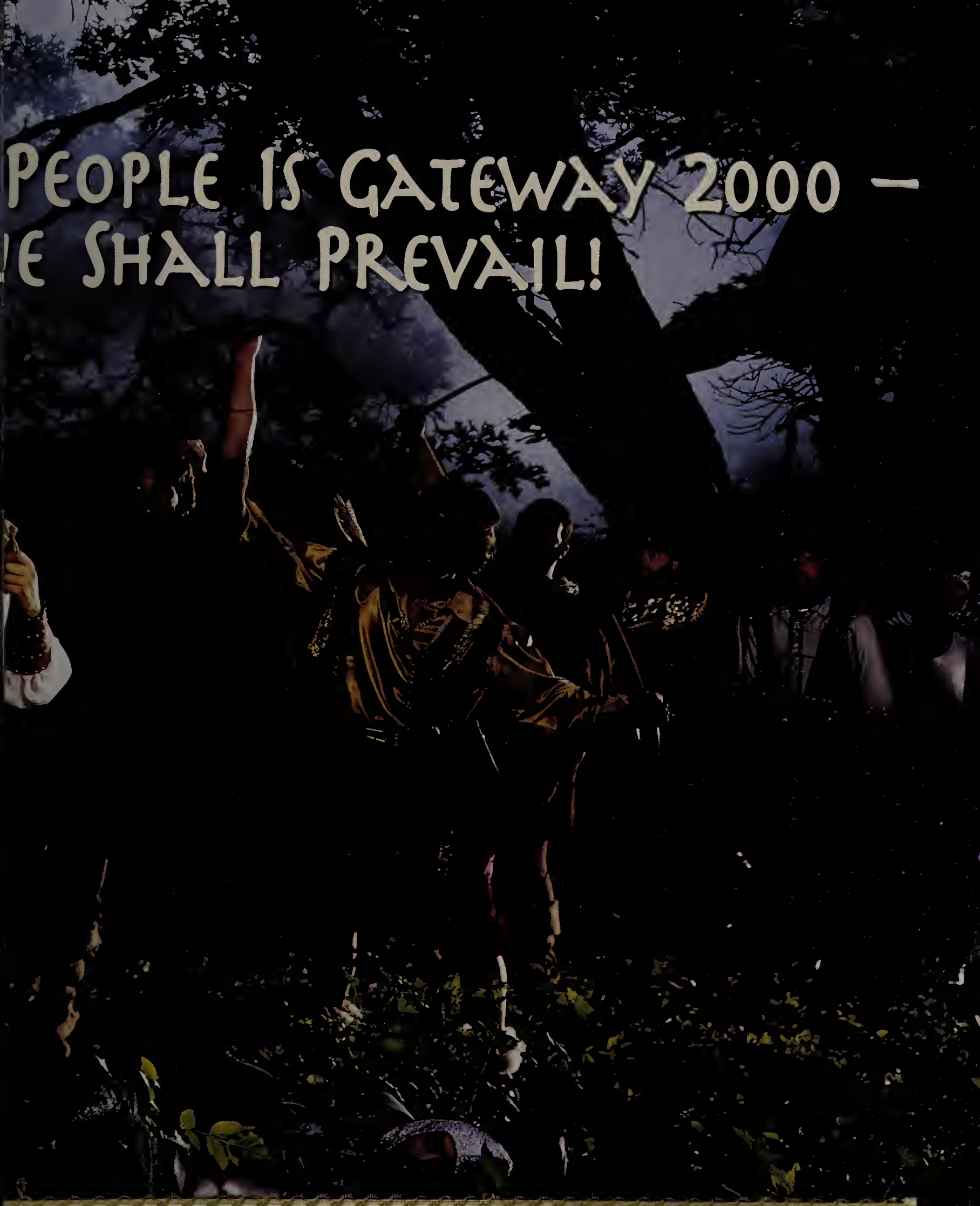

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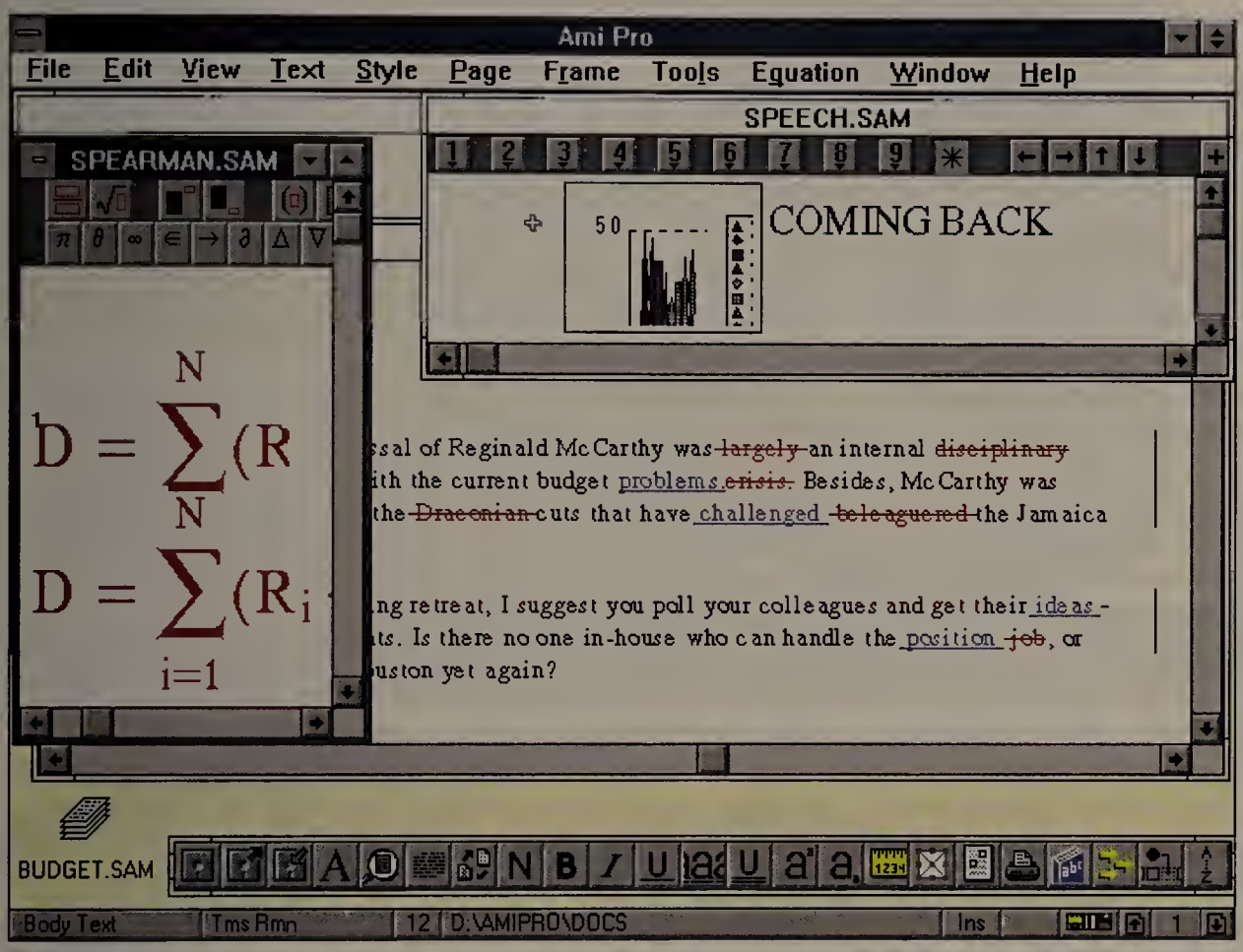
Ami Pro 2.0: Lookin' Good

Looking snazzier than ever with its push-button interface and versatile icon bar, Ami Pro 2.0 meets Word for Windows head-on in power features.



Ami Pro 2.0 lets you juggle several documents at once. Hot new features include a high-powered equation editor, a redliner for marking suggested additions and deletions, and an outliner.

Eric Brown

If it's true that looking good is the essence of feeling good, then the users of *Ami Pro 2.0* will be a very happy lot indeed. Version 2.0 of this *Windows* word processor revamps its interface to stunning effect with pull-up windows, 3-D buttons, and a versatile new icon palette that's so hot Lotus is adding it to *1-2-3 for Windows* and *Freelance for Windows.*

But the new *Ami Pro* offering is more than just pretty icons and friendly dialog boxes. Version 2.0 adds all the high-end tools that have given rival *Word for Windows* the edge among corporate users. In addition to improving the superb charting and drawing tools that made version 1.2 such a standout, Lotus has upgraded *Ami Pro* with an outliner, a redliner, and automation tools that are similar to *Word for Windows'* automated templates.

Taking Icons to a New Level

For many users, *Ami Pro 1.2* looked a bit too much like a paint program—they preferred the more corporate look of *Word for Windows'* sculpted ribbon bar. A smattering of design details lends the new *Ami Pro* a more professional look, but *Ami Pro*'s festive nature lives on with the enhanced color controls offered in this latest version.

Each icon is smaller, so you can fit more icons along any side of the screen. You can also float any number of icons freely in a box of any shape. Icons and buttons now sport the 3-D push-button effect popularized by *Excel 3.0.* Previously, you could set up macros as bare-bones buttons, but now you can also create custom macro icons, importing any metafile or BMP file to be the picture. The images scale to size automatically.

Even *Ami Pro*'s styles are more stylish. You can now select paragraph styles and font sizes from *Excel*-like pull-*up* menus that open from the bottom status line. This approach is more convenient than the floating styles box, which obscured the screen. Some other good news—you can now create styles by example—basing a style on previously formatted text. And because Lotus will bundle a copy of *Adobe Type Manager,* all your fonts will look sharp.

If you work with several documents at once, you'll appreciate the improved windowing. Version 1.2 let you open multiple windows, but the process was awkward, and a new menu bar in each window ate up real estate. Now you can open and resize windows easily, with a minimum of screen overhead, and cut and paste freely. You can even minimize documents into icons that sit at the bottom of the screen.

Other changes are less spectacular but add up to

SNAPSHOT

Ami Pro 2.0

WINDOWS An elegant interfoce roises this *Windaws* ward pracessar to o new level of ease, but the big story far corparate buyers is its powerhouse features.

KEY FEATURES

- **Customizable icon palette**
- **Outliner**
- **Group editing features**
- **Improved windowing**
- **Power fields for automated documents**
- **Equation editor**

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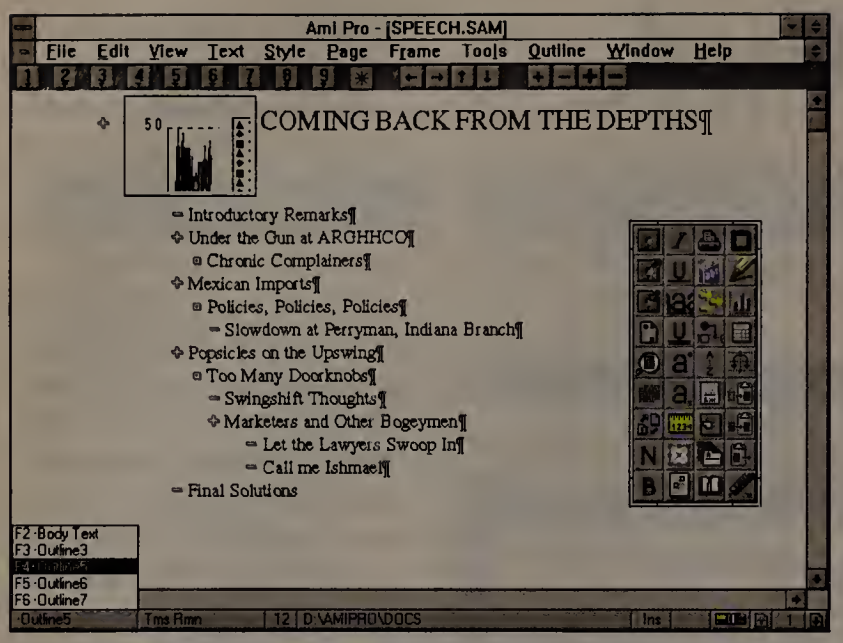


You can freely change the size and location of Ami Pro's new icon palette. Here it floats above an outline generated with the new outliner. The outliner is based on styles, which you now select from a pull-up menu on the bottom status line.

heightened convenience. An interactive tab ruler includes tab icons, so you can designate a right-justified tab without working your way through a dialog box. Like Symantec's *JustWrite*, *Ami Pro* recognizes and converts alien file formats on the fly when importing documents. And like *Word for Windows*, *Ami Pro* displays the names of the last several documents opened on the File menu.

Outline for Success

Ami Pro devotees had to wait a long time for an outliner, but now they've got a good one. This fully integrated outliner lets you expand and collapse nine levels of headings by clicking on an icon bar along the top. As with *Word for Windows'* outliner, you can integrate and hide text and copy hidden text simply by copying the heading.

Another catch-up to *Word for Windows* is the addition of group editing features. *Ami Pro's* redliner marks suggested deletions and additions in a specified color or attribute, and you can accept or delete edits individually. If your editor failed to use the redline feature when finessing your document, you can resort to a Compare feature that compares two versions of a document to create edit marks automatically in the current version.

Lotus has upgraded the table editor with multipage features. In a text table format, if you have rows with more than one line, you can now break pages between lines. Previously, you could end up with a blank space on the bottom of a page because *Ami Pro* forced the entire multiline row onto the next page. You can also easily repeat the headings along the top of each page.

Additionally, *Ami Pro* has improved long-document features, offering a master-document function similar to the one in *Ventura Publisher:* You can keep "chapters" in separate files yet treat all the files in a tagged group as a single document. To update page numbers, you run one update instead of processing each chapter file separately.

Scientists and technical users should be happy with the equation editor, which is based on the Tex mathematical typesetting language. You build and manipulate equations by selecting icons on the main editing screen rather than in a separate editor.

Grabbing Greater Graphics

Ami Pro's already capable charting and drawing features are getting downright sophisticated—enough to steal some sales from low-end desktop publishing packages or maybe even from Lotus's *Freelance.* Frames have always been fundamental to *Ami Pro's* success with graphics—all text and graphic elements reside in these discrete holding areas, making it easy to manipulate them without affecting surrounding text. But now the frames don't have to be boring old rectangles—you can add rounded corners, create oval frames, apply automatic shadows, or shade them with any color. Additionally, you can place clip art in text and watch the text wrap while you edit.

In the old charting module, the miniature example chart in the dialog box was a dummy. Now it's live so you can manipulate it directly, avoiding lengthy screen refreshes and keeping you closer to the controls. Like the latest charting packages, *Ami Pro* offers 16 color schemes, and you can now chart negative data values and manually adjust chart perspective.

Lotus has also upgraded the drawing module. You can draw lines and arrows directly on a chart, draw freehand, sketch Bézier curves, and manually rotate both images and text in any direction without a dialog box detour. *Ami Pro* now ships with over 100 clip-art symbols instead of the previous handful. Not only can you save objects as BMP files and metafiles, you can completely edit a clip-art graphic after you've imported it.

At Play in the Fields of Power

Ami Pro's new *power fields* appear to do everything *Word for Windows'* automated templates do—more if you combine them with macros. Power fields are essentially variables that you place within cross-reference marks embedded in the text. Power fields can also analyze other variables, sort of like conditional mail merge within your main document. For example, you can use a power field for numbering charts in sequence—it can automatically check to see what page a chart is on, determine its position relative to the other charts, then number it accordingly.

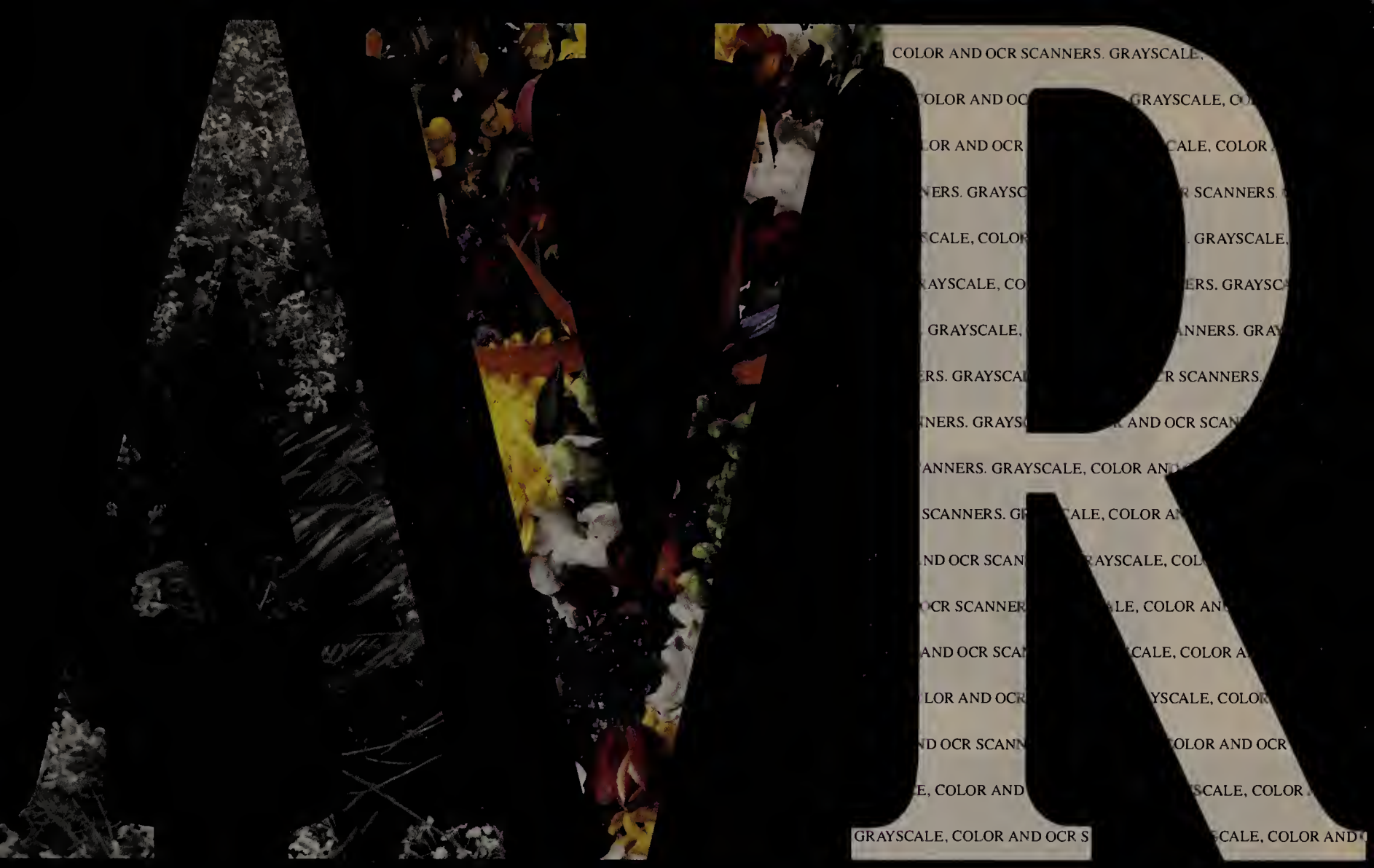
You gain further dexterity when you combine a power field with a macro. An IF...THEN statement connected to a power field in the text could check a sales figure from a table, perform a calculation, select from a list of phrases, and finally insert the words "encouraging results."

Advanced users can link power fields to macros to create intelligent forms that respond with pick lists, generate contact management systems, or develop hypertext doorways that sling you into other documents via Dynamic Data Exchange (DDE) links. As with *Word for Windows*, you can create stock templates of these power fields, saving them as style sheets.

Finally, the macros themselves are more versatile. Unlike with *Word for Windows*, you can attach macros directly to framed images, so clicking on a picture brings up additional information.

At least until the new version of *Word for Windows* comes out this fall, *Ami Pro* will reign as the premier *Windows* word processor. It's still somewhat easier to apply formats and manipulate graphics in *Ami Pro* than in Microsoft's baby, and *Ami Pro* is no longer missing major checklist items. It also carries the Lotus label, which should give buyers a sense of security. ●

Eric Brown is a senior editor for PC World.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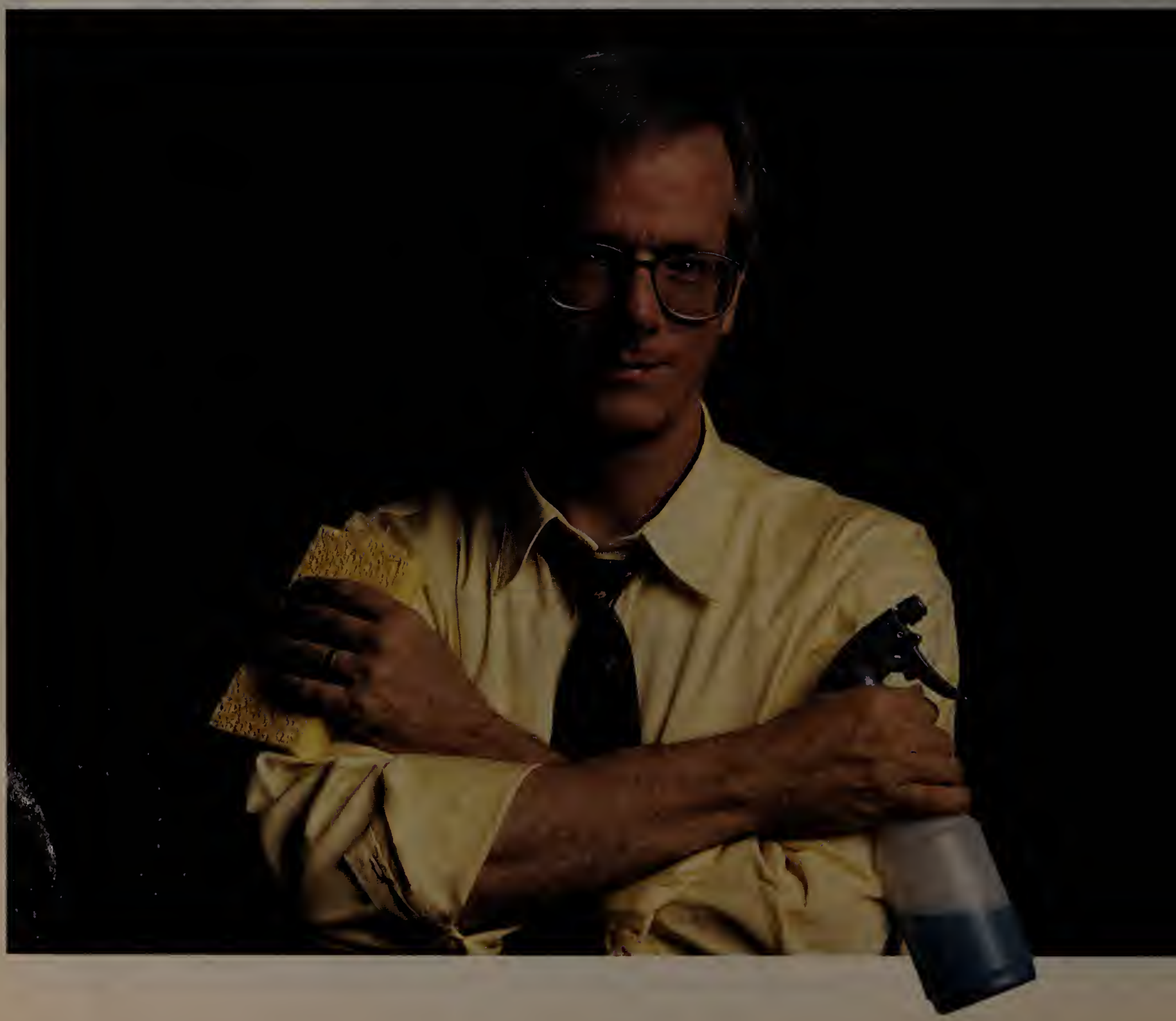

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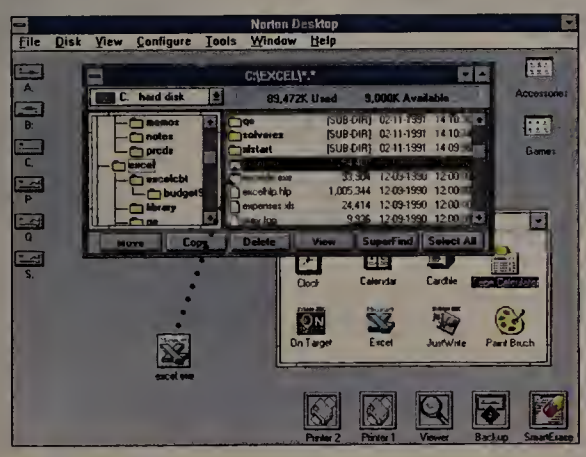

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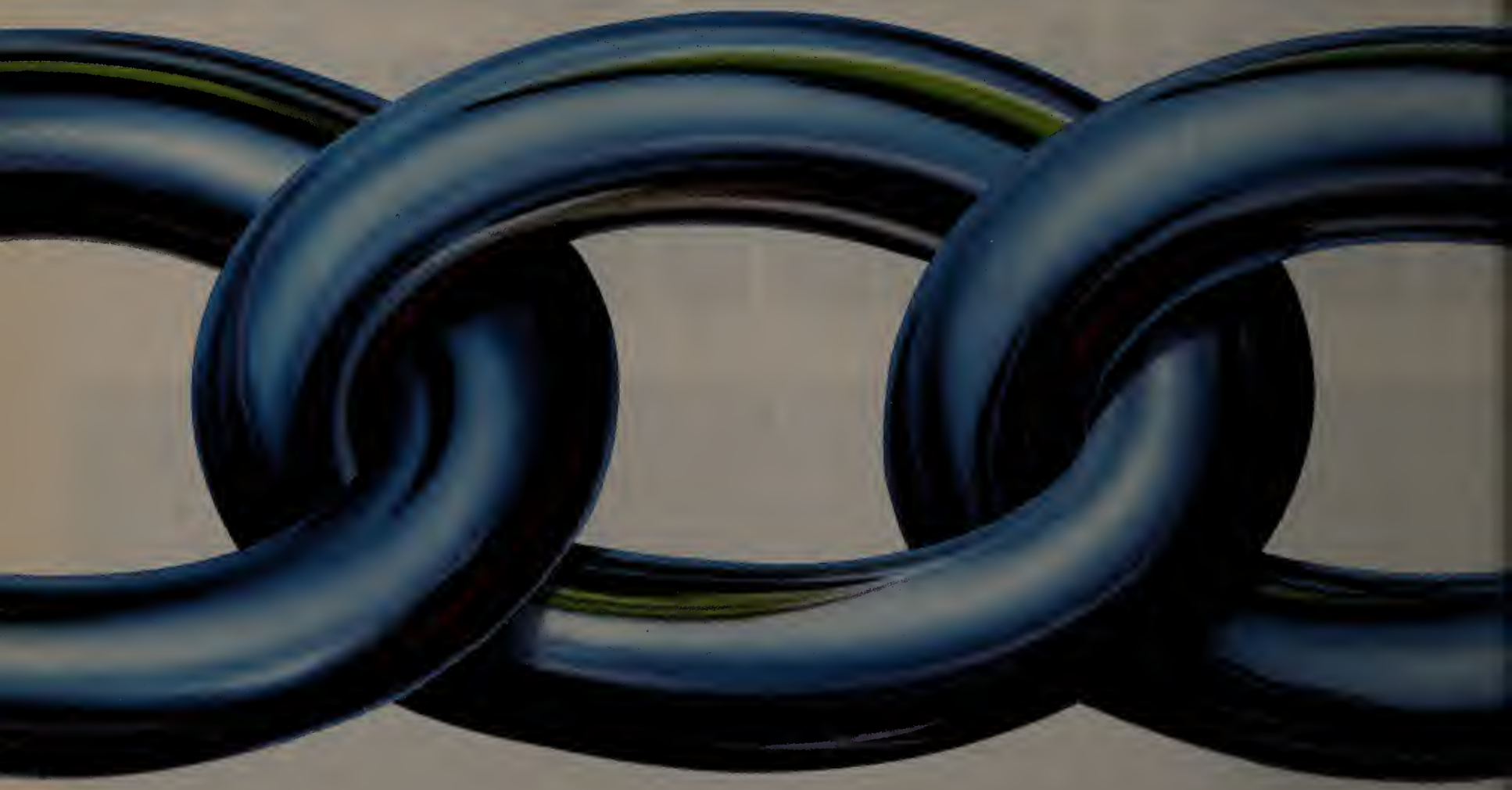
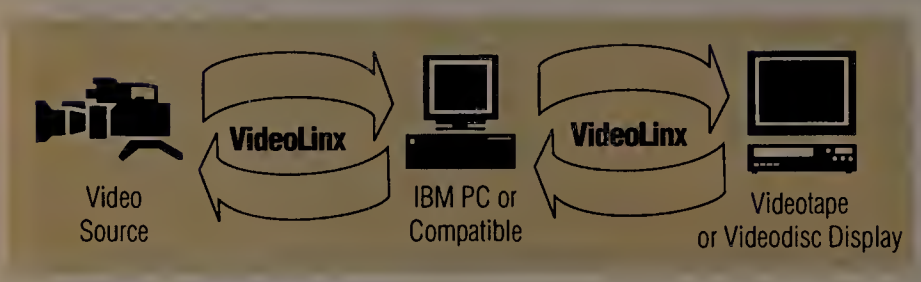


VideoLinx: FrameBuffer. $695.



VideoLinx and your PC have joined forces to put the technology of television stations on your desktop. At a price you won't believe.

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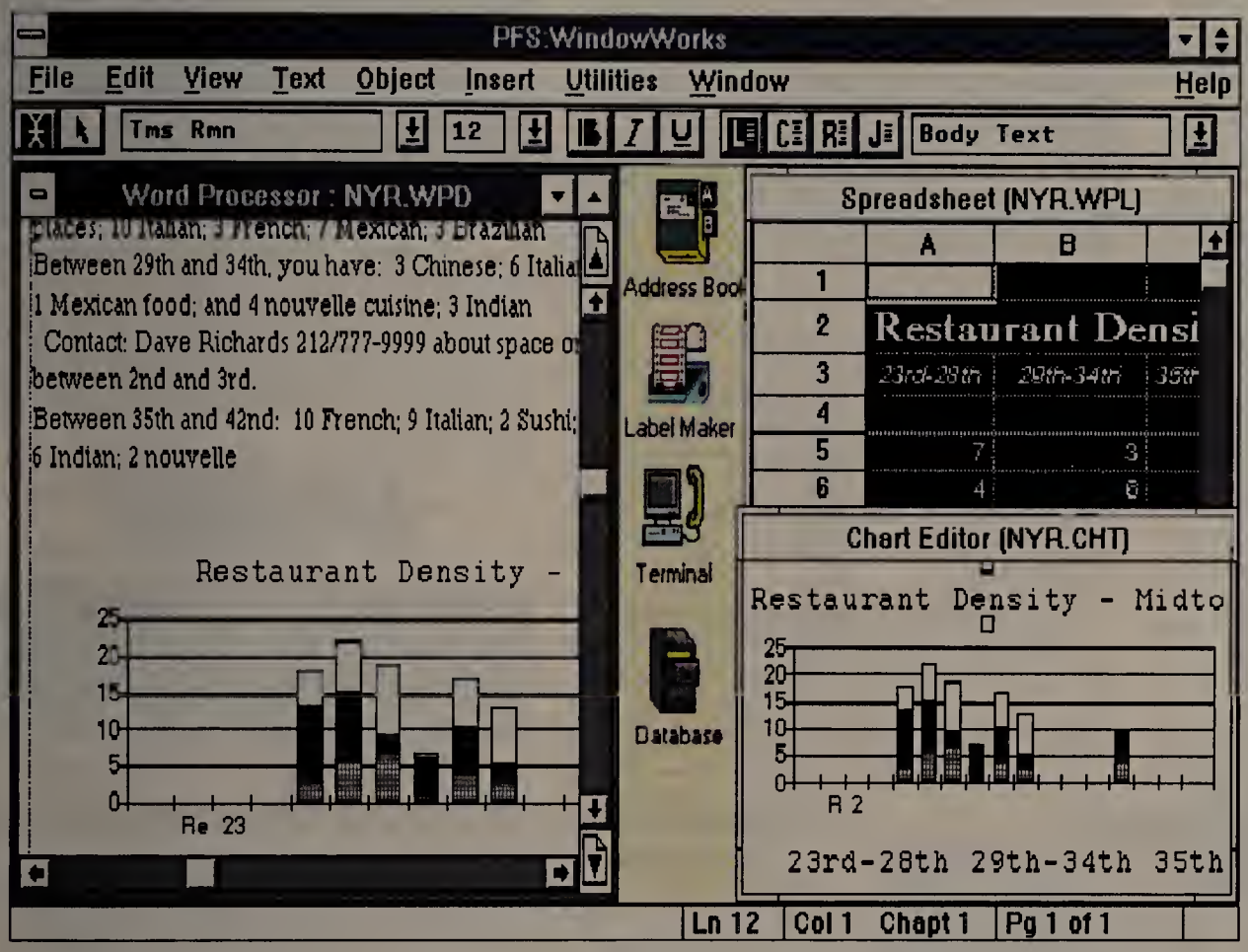
One-Stop Windows Shop

PFS:WindowWorks, the first Windows integrated package, can save new users time and money.



PFS:WindowWorks' tightly integrated modules make it easy to create high-quality documents.

Susan Lusty

You just acquired *Windows*, but you don't want to spend dollars or disk space on multiple stand-alone programs. Spinnaker Software, which recently bought Software Publishing's integrated packages, has been thinking about you. Its *PFS:WindowWorks* gives owners of small businesses, portables users, and others easy entry into the *Windows* world by integrating a word processor, a spreadsheet, a chart editor, a communications terminal, a data base manager, an address book, and a label maker in one package.

Seven Easy Pieces

The word processor—the most used module in any integrated package—is *WindowWorks'* strongest feature. It tops a very capable set of word processor features with entry-level desktop publishing abilities such as manual kerning, line drawing, and text wrapping. Spinnaker throws in Atech's on-the-fly font generator, *Publisher's Powerpak*, which comes with three WYSIWYG fonts to make creating newsletters or presentations easier at print time.

For number crunchers, Spinnaker's spreadsheet provides ample features. It offers 40 basic mathematical, statistical, and financial functions and imports *1-2-3* WK1 and WKS files. To see a spreadsheet in graph form, simply cut and paste to the chart editor, where you can view your profits in nine chart styles. If you change the spreadsheet, the chart editor updates its graph, thanks to *WindowWorks'* "hot links." If you dropped the graph into the word processing document, it's updated there too.

Unlike many integrated packages' communications modules, *WindowWorks'* is more than minimal. It supports the XMODEM and YMODEM protocols, and you can save log-on sequences using its scripting language.

A dBASE-compatible data base manager stores 32,000 records, and you can generate ten reports per data base. The package includes an address book and a label maker, which work with the data base for mass mailings and mergings.

Intuitive Integration

How does *Windows* aid *WindowWorks?* You'll find desktop publishing enhancements; *WindowWorks'* menus are more consistent than its DOS predecessors'; and you needn't close or minimize one module before opening another. You also can share your work via the Clipboard with other *Windows* packages, such as *Excel*, although DDE links aren't supported.

WindowWorks takes up 2MB on your hard disk, and you may like its performance on less than a 386SX with 2MB of memory. But if you're moving to *Windows* and lack the budget or time to tackle full-blown applications right away—or if you simply want a taste of *Windows* applications—*WindowWorks* should do the trick.

Susan Lusty is an assistant editor for PC World.

SNAPSHOT

PFS:WindowWorks

WINDOWS Spinnaker's integrated *Windows* package offers a grab bag of tools and tighter integration than stand-alone DOS and *Windows* rivals.

KEY FEATURES

- **Hot links update data between modules**
- **Capable word processor with low-end desktop publishing functions**
- **Bundled WYSIWYG fonts**
- **Imports WKS, WK1, TIFF, PCX, DBF, DIF and other standard files**

AVAILABILITY

Immediate

PRICING

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Reader service no. 744

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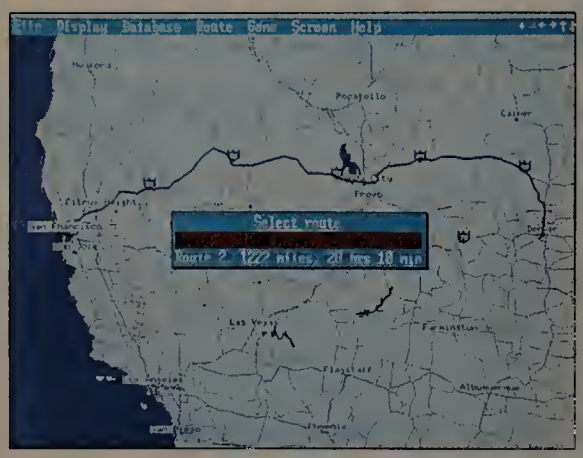


Just select your starting point, end destination, and areas to visit and let AutoMap create a detailed map of your next trip!

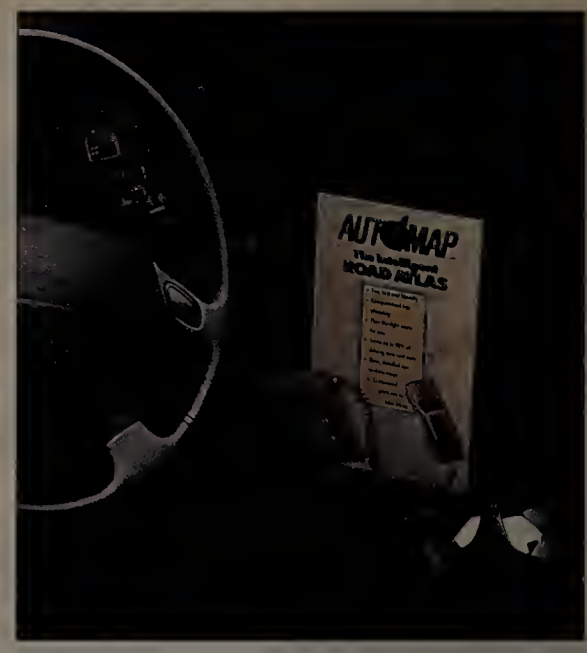
AutoMap's powerful intelligence takes over from there. Instantly, it searches its massive database of over 300,000 miles of roads and highways for the best route to meet your requirements. It even gives you a list of alternative routes if you decide you'd like to wander a bit. AutoMap also gives you a list of "places" from over 50,000 in its database. It's like having a travel guide pointing out the very best there is to see and do. If you're a business traveller, you won't have to worry about being unfamiliar with new territories — just a quick session with AutoMap and you'll know exactly where you're going.

AutoMap's driving instructions tell you which roads to travel, how far to go, and approximate traveling time.

AutoMap allows you to view your entire journey as a full color map and gives you all the details on mileage. Zoom out to see the entire region, or zoom in to see every detail. AutoMap's driving instructions list all the roads you'll be traveling, exactly how far to go, exactly where to turn and even the signs to look for! These maps and directions can be viewed on your screen and printed out to refer to as you need them.

Government Highway Data.

AutoMap uses data with the renowned accuracy of government sources. It has been designed to remain accurate with constant updates of new maps and details as they become available. AutoMap has



proven itself with the most demanding businesspeople and vacationers. It's helpful and convenient, but more importantly, AutoMap will save time, money and frustration. In fact, surveys show that AutoMap can easily save up to 20% in driving time and related costs. There's even a built-in quiz to test your knowledge of geography.

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AUTOMAP

RQ4098-5 **AutoMap** 5½" **$99.95**
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Hercules, CGA, EGA, VGA, 512K RAM, hard disk, mouse recommended.

The Ultimate Word Processor For Windows!

More than word processing, more than desktop publishing, Ami Pro makes the best use of the powerful WYSIWYG environment and brings your documents to a new level of sophistication — and ironically, we found it much easier to use than Microsoft Word for Windows. Ami Pro's extremely intuitive nature makes it fast and fun to use.

View your documents as you edit them, including all text, headers, footers and footnotes. Use Ami Pro's "frames" (which can contain text for page-within-page formats) to pick-up-and-place graphics easily and position them precisely within the page. You'll see it right on-screen.

Enjoy features they can't find anywhere else, like tables that allow you to perform math, automatically create charts and graphs (easily import data for charts from spreadsheets with 12 styles to choose from), draw, employ its Dynamic Data Exchange capabilities with other Windows applications and even create documents using its powerful style sheets.

Ami Pro includes a set of style guides that you can use to quickly put together ads, multi-column newsletters, brochures, letters, reports, presentations and even your everyday correspondence.

With Ami Pro's graphics handling

features (using its "frames" described above), inserting graphics is just a mouse-click away — with exact positioning. See it as you work!

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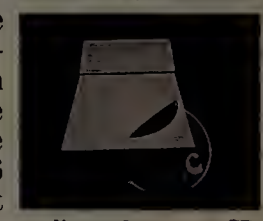
In addition to all the fabulous features of Corel Draw! 2.0, you get over 3500 *extra* professional, color clipart images! Not just your average clipart, this is from ArtRight — a leader in the art business. PC Mag recently awarded ArtRight their Editor's Choice Award after reviewing lots of clipart (including Arts & Letters).

This same clipart alone (without Corel Draw!) is still sold on diskette for $1192 and takes up 43 diskettes. But you can have it on a single CD for a fraction of the cost. And as a bonus -- your CD clipart is not compressed, meaning it will load up to 10 times faster than the diskette version!

NEC CD Reader



Why settle for an off-brand when you can have the best? The NEC CDR-36 is the latest release in a long line of proven CD Readers. Tried and true, this sleek new CD Reader will welcome you into the world of CDs. You'll soon fall in love with the vast amounts of information CDs place at your fingertips. Perhaps next you'll add an entire encyclopedia on a single CD to your library — or maybe all the phone books in the U.S. (Think about the mailing and telemarketing possibilities!)

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Requires AT or above, hard disk, 640K, Windows 3.0, mouse.

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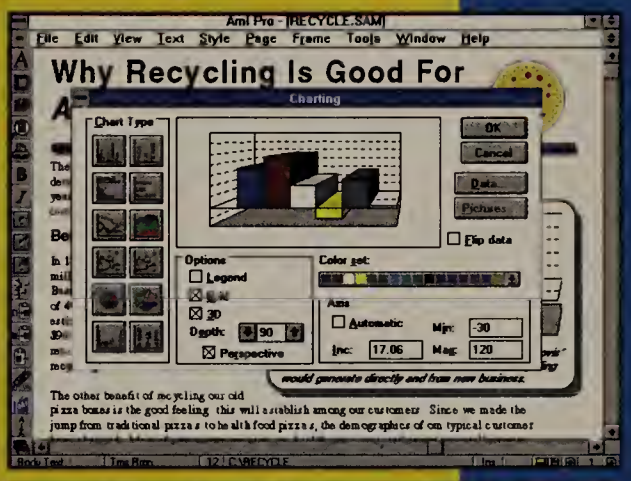

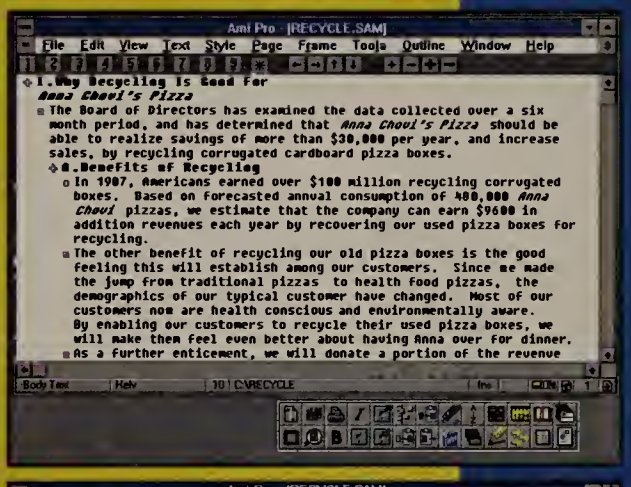

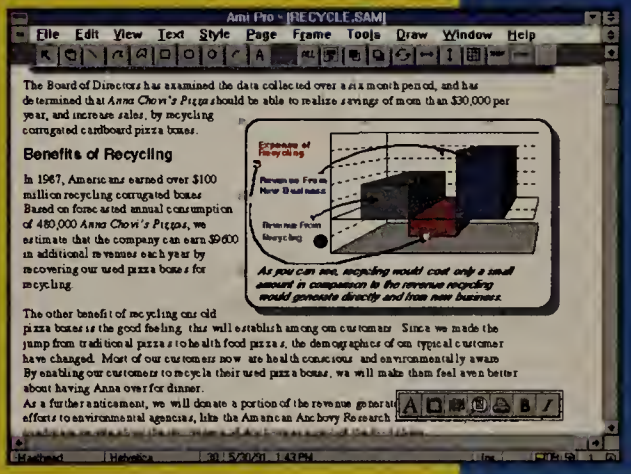

Test Drive Ami Pro™ Version 2.0 from Lotus,® the Visual Word Processor for Windows

What's on the Test Drive disks?

You'll receive a working model of *Ami Pro* version 2.0 from Lotus Development Corporation, the new word processor designed from the bottom up for *Windows*. *Ami Pro* makes creating documents easy and quick because it works the way you think—visually. You'll see the difference right from the start with the extensive palette of time-saving *Ami Pro* Smart Icon buttons. Explore further and create professional-looking business documents with the click of a mouse, using *Ami Pro* style sheets and advanced charting and drawing functions. You'll also discover how *Ami Pro* takes the guesswork out of formatting by providing interactive preview windows that instantly show changes to your document. What's more, *Ami Pro* links to the full suite of *Windows* applications from Lotus, including *1-2-3 for Windows*, so adding data is a snap.

Your *PC World* Test Drive also comes loaded with valuable additional features you won't find elsewhere, like a unique product guide and sample files that put *Ami Pro* to work for you. So hurry: Supply is limited, and demand is very high.

How do I get my disks?

It's easy. Simply complete and mail the postage-paid reply card, or call Lotus at 1-800-872-3387 ext. 1236 in the U.S., 1-800-668-1509 in Canada. Expect your disks to arrive in four to seven weeks. Remember... the supply is limited, and you won't see this offer anywhere else.

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- Mouse

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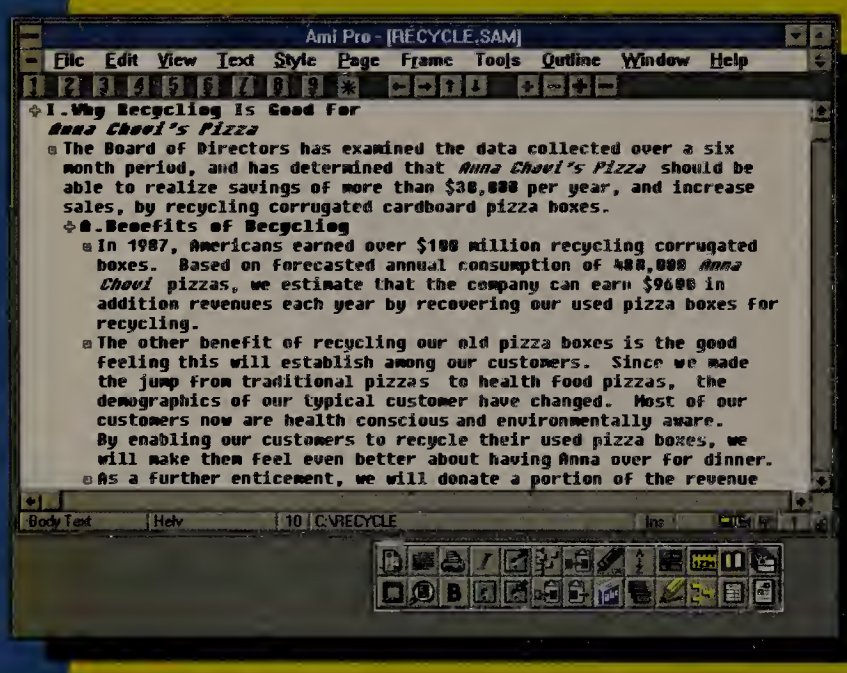

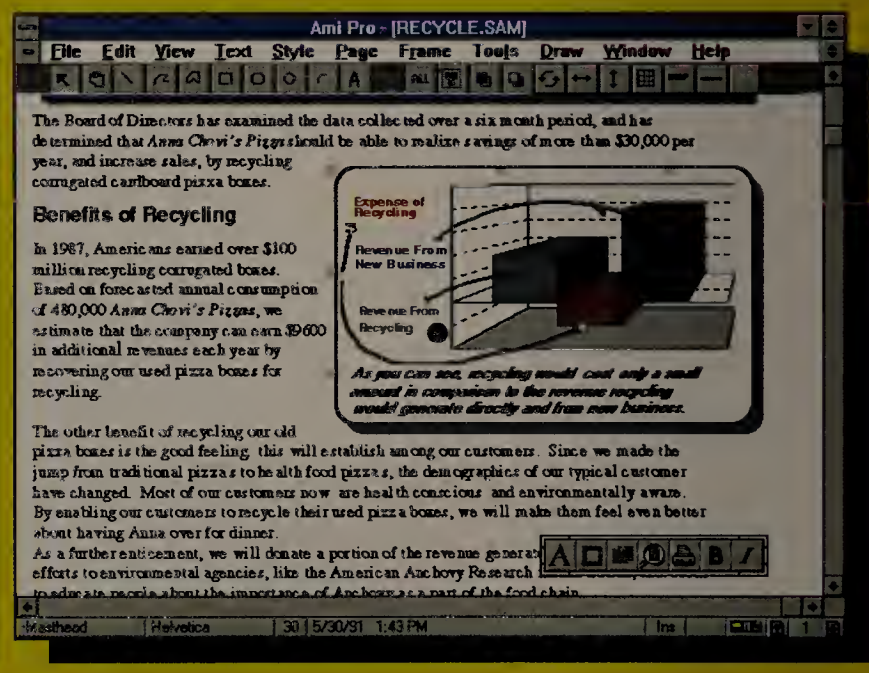

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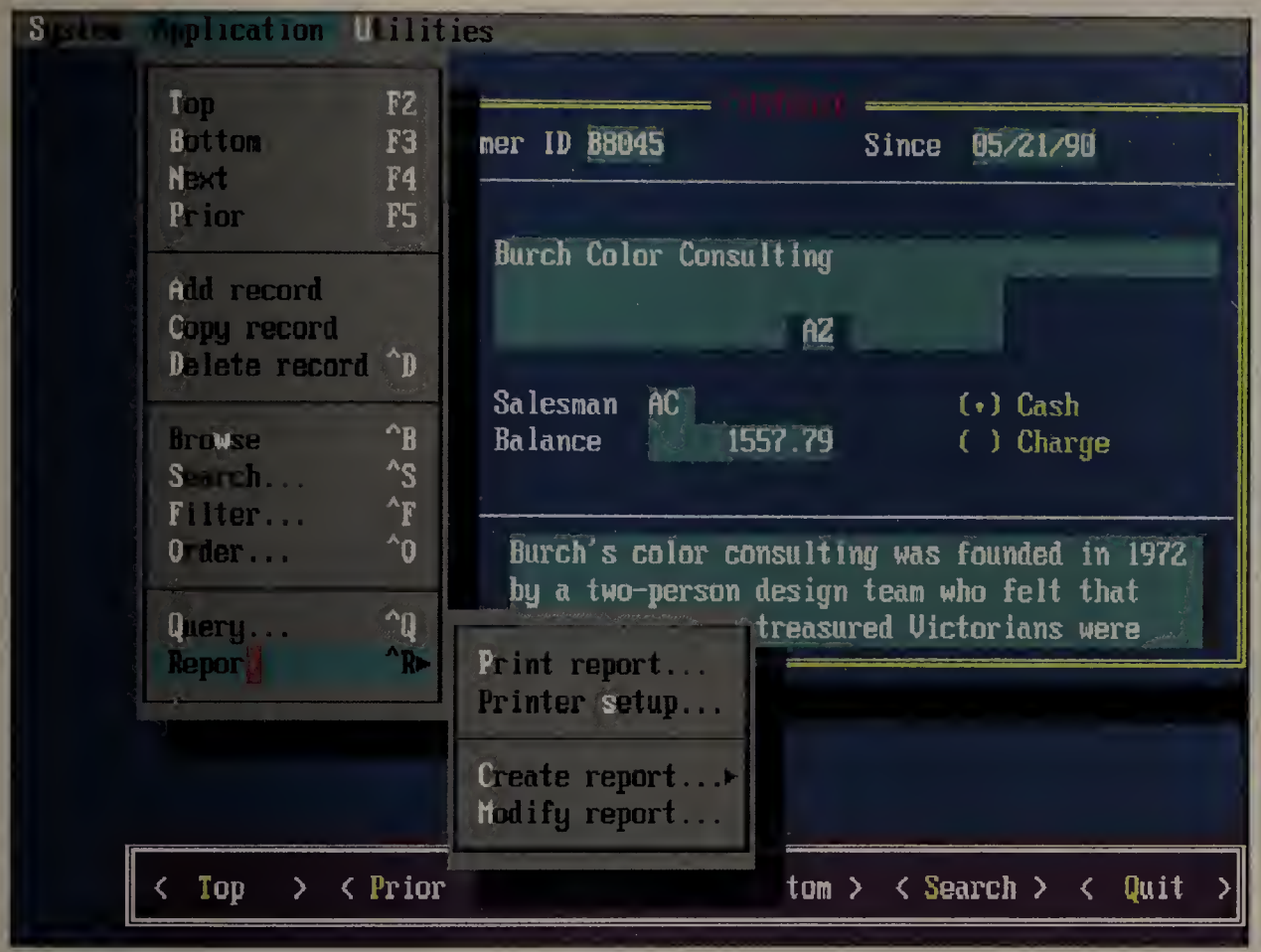

FoxPro 2.0 makes it easy to create a data entry screen—and a simple yet complete application.

Alan Schwartz

With its character-based windowing interface and benchmark-setting performance, Fox Software's *FoxPro* has built a reputation for fast, easy dBASE-compatible data management. The new *FoxPro 2.0* is even faster and easier, thanks largely to patent-pending technology—named Rushmore—that simplifies and speeds up searches.

Consider a simple example: listing, in alphabetical order, Arizona customers with balances of more than $1000. With *FoxPro 1.02* or any other dBASE product, if you simply look for the data—for instance, with a command like LIST FOR State = "AZ" AND Balance > 1000—you have to wait a long time for the answer. To get results quickly, you're forced to devise some sort of clever index-oriented strategy.

With version 2.0, Rushmore handles the strategy for you. The results are astonishing: In a casual test with the LIST FOR example above, *dBASE IV 1.1* took 170 seconds to pull 50 records from a 10,000-record file, *FoxPro 1.02* took 140 seconds, and a prerelease version of *FoxPro 2.0* managed it in only 4! And complex relational searches are accelerated even more.

The fields you search on must still be indexed, but that's no problem—because like *dBASE IV*, *FoxPro 2.0* keeps all of a file's indexes together and updates them automatically.

Query by Design

You'll also have an easier time setting up complex relational searches, thanks to a new query-design screen. At first glance, you may not find it as intuitive as the *Paradox* and *dBASE IV* query-by-example (QBE) screens—it doesn't look like a browse table—but the near-instant results make a terrific learning aid. Furthermore, *FoxPro*'s layout puts more options and information on the screen than a conventional QBE does.

You don't have to be a programmer to create *FoxPro* applications anymore. Now you can quickly and easily construct a comprehensive program by pointing and shooting with a mouse. Some tasks, like setting up complex data validations, still require programming. One plus: *FoxPro*'s agile browse windows now elegantly display one-to-many relationships.

Professional developers can now create stand-alone EXE programs with a $500 royalty-free distribution kit. And thanks to the new open architecture, C or assembly programmers can take *FoxPro* places that Fox Software never envisioned.

FoxPro 2.0 is a great tool for professional programmers, amateur programmers, and people who just need to get at their data easily. The program puts lightning-fast data access in the palm of your hand.

Alan Schwartz is a principal in MicroMega Systems, a data base design and training firm in San Francisco.

SNAPSHOT

FoxPro 2.0

The fastest data manager araund becames easier far users, mare capable far programmers, and speedier far everyane.

KEY FEATURES

- **Unprecedented data-retrieval speed**
- **Relational query-building screen**
- **Point-and-click application-building tools**
- **Handles true one-to-many relationships without programming**

AVAILABILITY

Immediate

PRICING

Single-user versian $795, LAN versian (unlimited users) $1295, rayalty-free distributian kit (replaces unlimited run time) $500, API develapment kit $500; upgrades (free if purchased after February 1, 1991) far single-user versian $195, far LAN version $250, far run time ta rayalty-free kit $100

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With Our New SX Models, IBM Maximizes The Power Of The Intel 486 Chip. Again.

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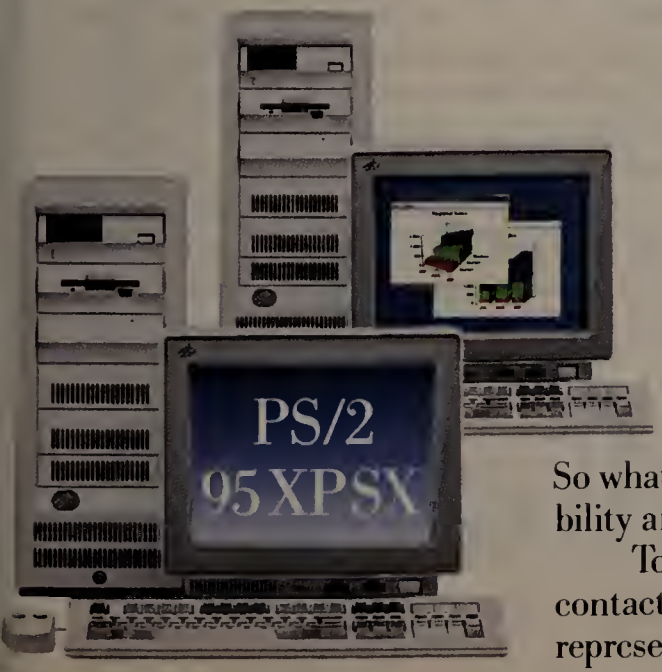
All the Models 90 and 95 are designed to use the most advanced components to achieve optimum balanced performance in power, speed, storage, memory and XGA graphic resolution. Like their forerunners, the new 90 and 95 XP SX models possess a 64-bit processor-to-RAM path and advanced Micro Channel™ 32-bit architecture for lightning-fast data flow and improved data integrity. The 4MB RAM standard on the SX models is doubled to 8MB on the 25 and

got a champion, the line.

33 MHz models, so challenging hurdles like multimedia are easily cleared. The 25 and 33 MHz models also include a math co-processor for improved performance in numeric-intensive applications like financial modeling and CAD/CAM.

But perhaps the most compelling feature of today's champions is their ability to adapt to the needs of tomorrow. With Expandable Processsor (XP) technology, all models can easily be upgraded to speeds faster than 33 MHz in the future. With the standard SCSI busmaster, additional hard drives, tape drives and printers can be added. You can even add multiple processors with Micro Channel busmaster adapters. So what you get is a machine with the kind of strength, flexibility and staying power that makes a real champion.

To find out more about the leaders in 486 technology, contact your IBM Authorized Remarketer or IBM marketing representative. For a remarketer near you, call 1 800 272-3438.



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PRODUCT OUTLOOK

Edited by MIKE HOGAN

The Norton Utilities Version 6.0

A Grab Bag of Data-Saver Utilities

The latest Norton Utilities sports a more descriptive menu with an Advise option that suggests possible solutions to your disk and DOS problems.

Unless you're an absolute newcomer to PCs, you've heard of *The Norton Utilities*—a comprehensive package of data savers best known for restoring erased files and recovering files from disk disasters. The latest release does all that better, sports an improved interface, and includes a powerful substitute for COMMAND.COM.

The Norton Utilities 6.0 is a veritable grab bag of goodies that includes more than two dozen programs. The utilities are grouped into four general categories: data recovery and disk repair, system performance enhancement, data security, and a miscellany of tools that make your time at the DOS prompt more productive.

If you spend a lot of time there, you'll be well served by *Norton*'s NDOS.COM replacement for COMMAND.COM. An enhanced version of the *4DOS* shareware product, NDOS.COM works just like COMMAND.COM except it implements four little-used DOS commands differently. It also adds a ton of features, among them on-line help and command history recall and editing. In addition, you get more flexible directory listings and command syntax (such as multiple commands on one line) and vastly improved batch file handling. All told, you have about 50 new commands at your disposal.

As in previous versions, the programs can be executed from the DOS prompt (*Norton* fully supports the new DOS 5.0) or launched interactively from a new master menu that's a significant improvement over the previous Norton Integrator. It boasts an optional graphical interface plus extensive customization capabilities. For example, you can add other programs to the menu, remove those you don't need, and modify the help screens. You can also specify a password to prevent access to some of the potentially destructive programs.

Although advanced users will certainly benefit the most from the product, novices will appreciate its lucid manuals and the on-screen help that always explains what the program is doing—and provides ample warnings of dangerous consequences.

Particularly handy is the new Advise menu option that proposes solutions to specific disk problems, DOS errors, and CHKDSK errors. Besides explaining what might be causing the problem, it guides you to the appropriate utility. The product is *Windows*-aware and warns you if you attempt to perform operations such as disk defragmentation while *Windows* is active.

Other version 6 enhancements include speedier disk defragmentation, a *Windows 3.0*–compatible disk caching program, and expanded/extended memory support for the RAM-resident utilities. The Prune and Graft feature lets you relocate a directory easily, along with its subdirectories and files—with only a few keystrokes or mouse clicks. Version 6.0 lists for $179, and $39 for upgrades. —*John Walkenbach*

IN BRIEF

The Norton Utilities Version 6.0
This all-inclusive data saver offers an improved user interface ond includes a powerful substitute for COMMAND.COM.
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INSIDE PRODUCT OUTLOOK

108 **MailMan 1.0** Get *Windows* E-mail today, electronic forms tomorrow.

108 **NetWare 2.2** Easy installation, improved memory management in Novell's more intelligible NOS.

110 **Picture Packer** Compress graphics images without loss of quality, and free up hard disk space.

112 **Visual BASIC** Microsoft's screen painter with compiler makes *Windows* program development easy for the part-time programmer.

112 **NEC CDR-83, Tandy CDR-1000** Affordable CD ROM drives that meet multimedia needs.

114 **Datellite 300** Use pen or finger to tap the desktop power of MicroSlate's keyboardless PC.

114 **dBASE IV Server Edition** Access your SQL data off a server *and* work with DBF files.

116 **Hayes Pocket Edition 2400** Miniature mobile modem lets you send and receive faxes and data from any PC on the road.

116 **Accpac Simply Accounting** Modular small-business package gets easier, better looking with *Windows*.

118 **ZyIndex for Windows** Text retriever indexes in the background and does versatile file searches.

MailMan 1.0

Windows E-Mail Has Forms in Its Future

Most of today's network electronic-mail packages not only provide the up-front tools for sending and replying to mail, but also manage connectivity tasks behind the scenes. Soon, as the market distills to a handful of back-end E-mail vendors such as Banyan, Lotus, and Microsoft, you'll see *mail-enabled applications*—front-end products that make a variety of E-mail engines more functional. One of the new breed is *MailMan*, a slick *Windows* product that helps you manage your E-mail today and will add intelligent electronic forms to help you smooth your office's work flow tomorrow.

Like *cc:Mail for Windows*, *MailMan* takes full advantage of *Windows*, letting you keep multiple messages and folders open and cut and paste between them. A unique icon bar called the Navigator lets you flip between open messages and folders.

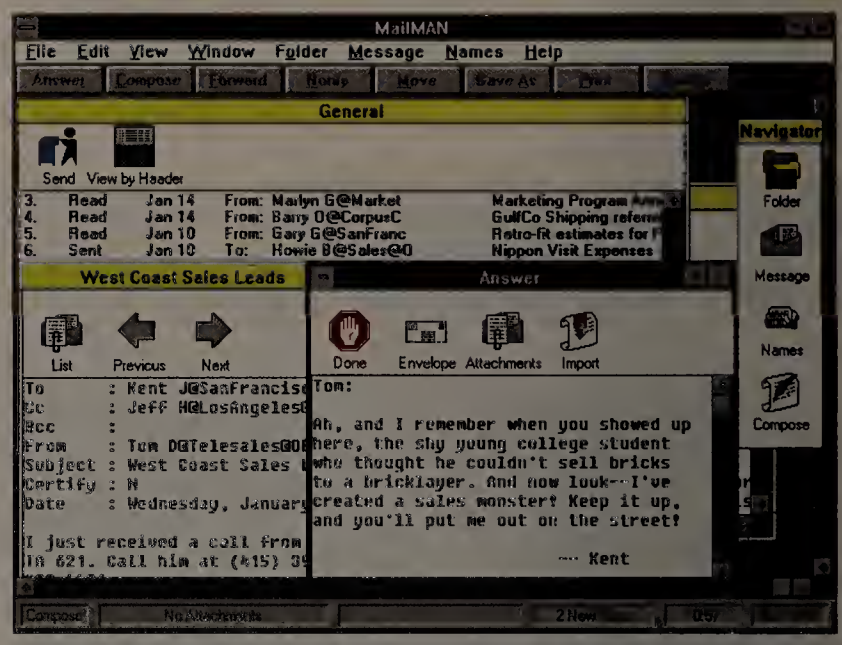
You also use icons or pulldowns to access *MailMan*'s many features, including mailing lists and folders. Click on an attachment, and the appropriate application launches. One nice touch: You can select a group of files for moving or deleting en masse.

Today, *MailMan* works in front of VINES' E-mail engine. This fall, NetWare users should be able to buy a version that runs with Novell's new MHS 1.5 E-mail hub and works alongside E-mail products such as *cc:Mail* and *Da Vinci*. It's priced at $995 for 20 users and $1995 for unlimited usage per mail server.

By year-end, *MailMan* should offer new options that integrate electronic forms. Current E-mail packages lack the intelligent fields needed for forms, and current form packages lack routing and tracking. *MailMan* should bridge this gap.

The later version should let you select a form such as an expense report, fill it out, and send it to your boss, who electronically signs it for approval and sends copies to the appropriate people. By applying intelligent rules that you can base on content, the form will know where to route itself. For example, if the loan amount field is over $10,000, the form is automatically forwarded to a senior bank officer.

Even without forms, *MailMan*'s friendly interface appears to make network E-mail easier to use. —*Eric Brown*



This flexible LAN E-mail manager lets you keep numerous messages, replies, and folders open at once without losing track.

IN BRIEF

MailMan 1.0
WINDOWS This Windows package helps you manage your own E-mail glut today and promises to smooth your office's work flow tomorrow.
Reach Software Corp.
330 Potrero Ave.
Sunnyvale, CA 94086
408/733-8685,
408/733-0482 (fax)
Reader service no. 619

NetWare 2.2

Novell Consolidates NetWare Line

Shopping for NetWare just got a lot easier, because the confusing array of NetWare flavors has merged into two.

For servers with many users, heavy traffic, or client-server applications, there's NetWare 386 3.11 (see June's *Product Outlook*). For those with lesser demands, NetWare 2.2 offers easier installation and better memory management than the old NetWare 286 line, along with price breaks for smaller nets.

NetWare 2.2 combines all the features of the old ELS, Advanced, and SFT products (see "Can You Do Better Than NetWare?" March 1991). That means not only transaction tracking and the backup security of disk mirroring for high-powered servers, but also a nondedicated server option for small LANs and easy installation for do-it-yourselfers. NetWare 2.2 also supports Macintosh workstations, and new Mac utilities ease network management on mixed nets.

Veterans who've mastered the arcane Netgen installation process will appreciate the painless new installation routine and quick-start instructions, while new users will just assume that's how things ought to be done. You can say good-bye to that huge, time-wasting pile of 360K floppies, too: NetWare 2.2 comes on the short stack of your choice, 1.2MB or 1.44MB disks.

Another welcome 2.2 feature is improved memory management. In previous versions, many functions made memory demands that, on heavily loaded servers, sometimes produced 'out of memory' errors that couldn't be fixed simply by adding more memory. In 2.2, NetWare's use of memory has been reorganized to give overburdened servers more breathing room.

NetWare 2.2 costs $895 per server for 5 users, $1995 for 10, $3495 for 50, and $5495 for 100. Upgrades from earlier versions range from $395 to $4995. —*Robert Lauriston*

IN BRIEF

NetWare 2.2
Entry-level and midrange NetWare versions are now a single, easy-to-install product with better memory management, Macintosh support, and price breaks for smaller networks.
Novell
122 East 1700 South
Provo, UT 84606
800/638-9273
Reader service no. 623

DOS

peck peck peck
peck peck peck
peck peck peck
peck peck peck
peck peck peck
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Direct Access®

peck

Compared to a menu program like this, everything else is for the birds.

If you've got Direct Access, you don't need a whole flock of keystrokes to get into the programs on your hard disk.

All you do is load it and forget it. Direct Access lines up every program on a menu and lets you create custom sub-menus for related programs and other applications.

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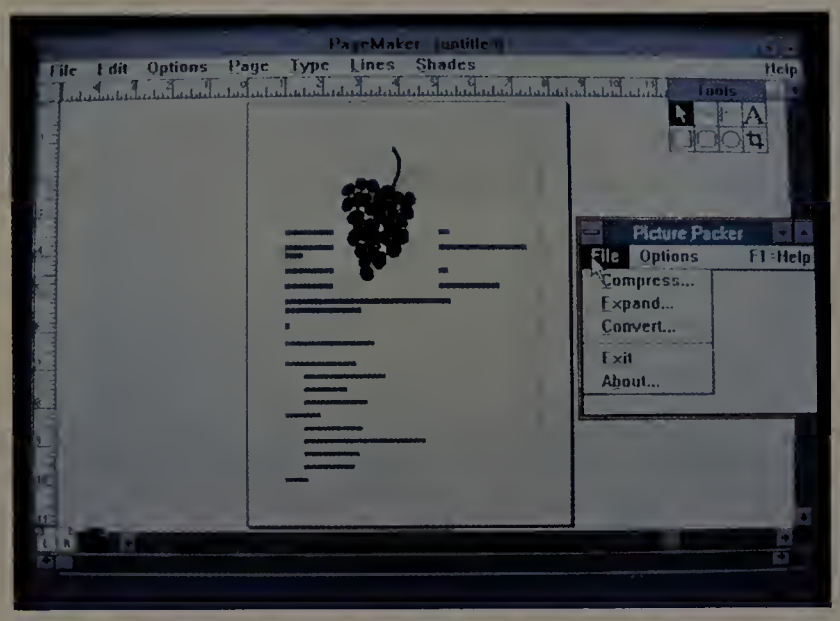
PC Magazine's Editor's Choice

Fifth Generation Systems, Inc., 10049 N. Reiger Road, Baton Rouge LA 70809 Sales Number (800) 388-0362 Technical Support (504) 291-9953

Circle 81 on reader service card

Picture Packer

Image Compression Packs a Wallop



Squeeze those huge graphics files to 1/30 their original size without noticeable loss of image quality, or even smaller if precision isn't vital.

Shortly after you buy your first scanner, your hard disk starts looking about the size of something on the end of a toothpick. Even medium-resolution images fill up your platters PDQ. You could always buy another hard drive (if you have the space and don't mind switching between volumes), or you can try to squeeze more files onto the one you have with an image compressor.

Picture Packer gives you two ways to pack a picture. This $79 program squashes disk-filling images down to 1/30 their original size without noticeable deterioration or down to 1/50 if you're willing to sacrifice image quality. The process is fairly quick: On a 20-MHz 386 computer, it takes 20 to 25 seconds to compress a 500K file to as little as 10K.

If you're a serious desktop publisher or presentation maker working with a superabundance of large graphics files, you can cut compression time down to less than 5 seconds by adding *Picture Packer*'s $595 accelerator card, which uses a Texas Instruments digital signal processor. A $100 coupon in every copy of the software means you won't be penalized if you try the software first and go for the accelerator card later.

Picture Packer will compress TARGA, TIFF, PCX, and GIF, a lineup that should cover most of the formats used for desktop presentation, publishing, and animation applications. However, *Picture Packer* converts them to TIFF or TARGA format, as you choose, so it outputs only those formats after decompression. It comes with an interface for DOS and one for *Windows 3.0*.

Like most programs of its ilk, *Picture Packer* utilizes Joint Photographic Experts Group (JPEG) compression to save time and space. No problem for graphics files, even when you intend to print them at 300 dpi. But the manufacturer doesn't recommend *Picture Packer* for compressing data base or text files. Also, you won't want to use the higher-compression sampling technique on scientific or color prepress graphics applications, where every pixel is precious. But you can set *Picture Packer* to save every bit and still get compression of 5 to 1.

Decompression integrates smoothly with your day-to-day applications, thanks to a memory-resident utility that requires only 19K of conventional memory. When you call up a compressed TARGA or TIFF file, the package automatically decompresses it for you without making you leave your application.

Video & Image Compression includes a royalty-free utility you can give to friends in case you want to speed your modem transmissions by sending compressed files. You need at least a 286-based PC for either version of *Picture Packer*, plus DOS 3.0 or later. —*Mark Henricks*

IN BRIEF

Picture Packer
WINDOWS You can squash large graphics files down to 1/50 their original size and decompress and retrieve them in under 5 seconds with this hardware/software combination.

Video & Image Compression Corp.
21311 Hawthorne Blvd.
#235
Torrance, CA 90503
800/472-1888,
213/543-2117 (fax)
Reader service no. 628

SBT Database Accounting Library Professional Series

Package Targets the High End

Hoping to capitalize on the trend toward smaller systems, SBT has released a high-end accounting package for PC-based networks. *Database Accounting Library Professional Series* is for the company that wants to move its accounting system from a mini or mainframe to a PC net.

The *Professional Series* features pulldown menus and pop-up dialog boxes for easier data lookup. The program includes memo fields for keeping detailed notes on individual customers or vendors and customizable context-sensitive help.

Currently, only seven modules are available: general ledger, accounts receivable, accounts payable, sales order, purchase order, inventory control, and the required system manager module. But SBT plans a wider range of modules, as well as contact and communications manager options—both of which are currently available for the firm's *dBASE*-based *Accounting Library Series Six*. (SBT wrote the latest version in Fox's faster *FoxPro*.)

Professional Series requires 540K of memory (expanded memory is recommended), DOS 3.1 or later, 7MB of storage for the system manager, and 3MB for each module. A 386 is highly recommended. Individual modules sell for $1295, except the inventory control module, which retails for $395. Source code is included in the purchase price. —*Roberta Furger*

IN BRIEF

SBT Database Accounting Library Professional Series
SBT's *Professional Series* brings greater speed and flexibility to the high-end accounting market.

SBT Corp.
One Harbor Dr.
Sausalito, CA 94965
415/331-9900
Reader service no. 631

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If you're not backing up regularly, you either don't have the right backup program, or you don't have one at all. Fastback Plus 3.0 solves both problems with an entire program full of time and effort-saving features that make backing up so automatic, you can literally do it in your sleep.

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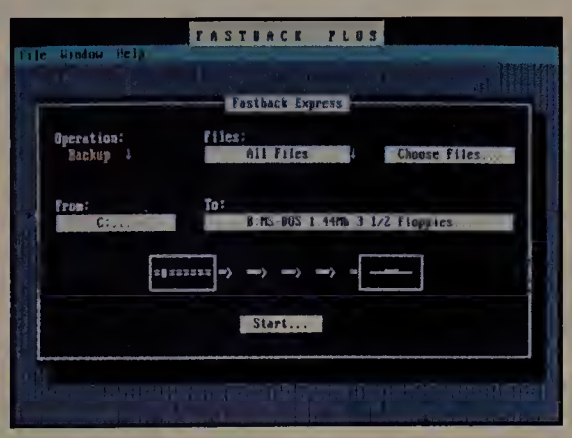

The new fast, simple Express Menu.

And like all Fifth Generation products, Fastback Plus 3.0 is automatically covered by a one-year, money-back guarantee. Upgrade now for only $49 and get FREE overnight delivery*. Just mail or fax the attached reply card with your payment to the address or fax number below. Or call us toll-free. This offer is limited to Fastback or Fastback Plus users with a valid program serial number.

And these are just a few of Fastback Plus 3.0's new features. Now more than ever, there's really no excuse not to back up your data. Because if you don't want to do it, this program will do it for you. Automatically. For more about Fastback Plus 3.0, call the toll-free number below.

FIFTH GENERATION SYSTEMS, INC

8 0 0 - 9 3 3 - 0 1 0 8

Fifth Generation Systems • 10049 N. Reiger Road • Baton Rouge, LA 70809
(504) 291-7221 Fax: (504) 291-5453

*U.S. destinations only. Fastback Plus 3.0 will not restore backups made with versions 2.09 or earlier.
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Circle 71 on reader service card

Visual BASIC

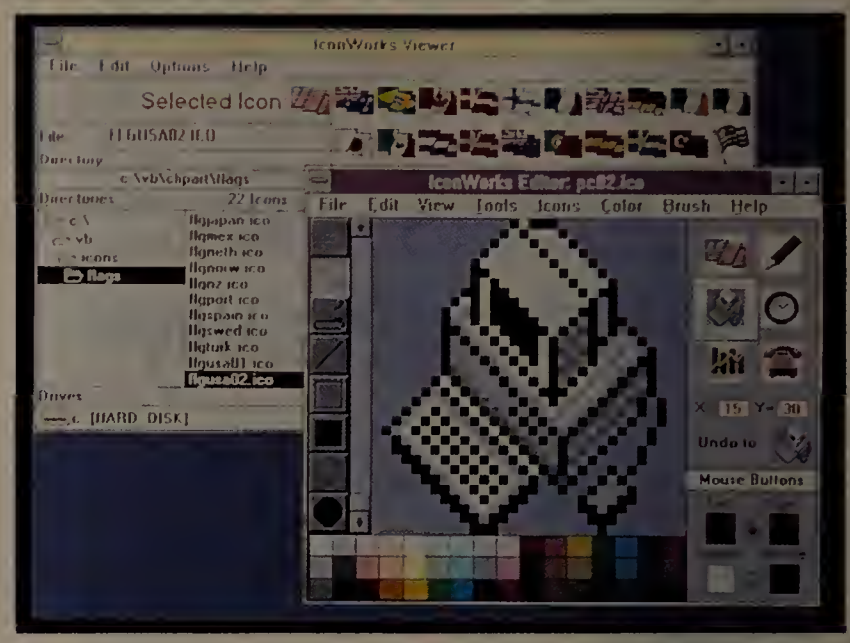
Easier Entry for Windows Programming

Microsoft invented *Windows* but did little to make programming in the environment anything but a chore. It took archrival Borland's *Turbo Pascal for Windows* and *Borland C++* to make *Windows* program development—with traditional languages and EXE file results—a reasonable undertaking. Microsoft is firing back with a relatively easy-to-use compiler, *Visual BASIC*.

Visual BASIC is easy to learn and use. It's intended for the part-time programmer—someone who needs something more versatile than Asymetrix's *ToolBook* but who isn't ready for *Turbo Pascal for Windows*. *Visual BASIC* is a screen painter with a BASIC compiler attached. You design a window with buttons, graphics, text boxes, whatever. In another window, you write BASIC code to define what occurs when an event (such as a click or keystroke) happens to that object.

The package feels a lot like *ToolBook* but produces EXE files that can be run inside *Windows* without a run time, and you're a step ahead if you already know BASIC. However, unlike most language products, *Visual BASIC* leaves you stuck with the bundled editor because the source-code files contain binary graphic information as well as BASIC code. And the program can't do everything a C or Pascal compiler can; it doesn't support a lot of the weirder *Windows* events and functions. *Visual BASIC* is open ended so new capabilities can be added, but you'll probably need C to do it.

Visual BASIC requires *Windows 3.0* and lists for $199—as inexpensive as development tools for the nonprofessional should be. —*Lincoln Spector*



This Microsoft compiler simplifies Windows programming through the use of on-screen objects.

IN BRIEF

Visual BASIC

WINDOWS Microsoft's development tool eases Windows programming by letting you paint your screens in one window and compile code in another.

Microsoft Corp.
One Microsoft Way
Redmond, WA
98052-6399
800/227-4679,
206/883-8101 (fax)
Reader service no. 621

NEC CDR-83, Tandy CDR-1000

Fast and Faster CD ROM Drives Rev Up Multimedia

Multimedia may be the buzzword of the nineties, but the majority of the equipment it requires is still priced well beyond the reach of most users. New CD ROM players from NEC and Tandy, however, deliver the massive storage needed for graphics-intensive multimedia applications at a price you can afford.

Tandy's CDR-1000 is the first truly inexpensive internal CD ROM drive designed to meet the performance demands of multimedia applications with a 150K-per-second continuous data transfer rate. For a higher price, NEC Technologies' CDR-83 internal drive matches Tandy's transfer rate and goes a step further to add the much quicker average access time that many applications require to function well.

The Tandy CDR-1000 is a ready-to-go CD ROM drive that, despite its unusually slow 900ms access time, produces a data transfer rate sufficient for smooth animation with continuous sound. And $400 buys everything you need to run the drive, including the interface card and software. Tandy also gives you an innovative disk tray assembly that eliminates the need for a clumsy disk caddy.

The $999 list price on NEC's CDR-83 (with interface kit included) is more than double that of the Tandy, and you'll have to add another $100 for PS/2-compatible and CDR-73 external versions. But you can expect to see the NEC drives discounted at independent resellers, whereas Tandy's Radio Shack outlets will provide you with no such price cuts. In addition, the NEC is a 300ms quick-access drive, which will enhance its usefulness for reference applications or uses requiring random seeks. And NEC throws in a two-year warranty to enhance your feeling of security. The CDR-83 is also XA ready, so you'll be able to run any multimedia application set up to work with this audio compression/storage standard. —*Rex Farrance*

IN BRIEF

NEC CDR-83, Tandy CDR-1000

Multimedia gets closer to your desktop as affordable new CD ROM drives from NEC Technologies and Tandy Corporation provide the storage and data transmission rate needed for smooth animation with continuous sound.

NEC Technologies, Inc.
1255 Michael Dr.
Wood Dale, IL 60191
708/860-9500
Reader service no. 626

Radio Shack
Tandy Corp.
700 One Tandy Center
Fort Worth, TX 76102
817/390-3300
Reader service no. 627

Until now, sharing a printer could cause excessive wear on some of your equipment.

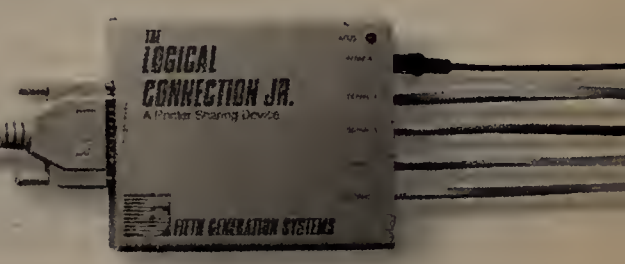
If you're on a sneaker network running between several PCs and one printer, your patience and productivity—among other things—are probably wearing a little thin.

And it could be worse. Major manufacturers report that you may actually damage your laser printer if you use a mechanical switchbox. But now there's The Logical Connection Jr.™

The Logical Connection Jr. safely connects four PCs to a single parallel printer using easy-to-install phone wires.

Working entirely with its own memory, it manages all incoming print jobs simultaneously in the background, freeing your PCs for business while it prints jobs in the order received. And although it runs beautifully without any software, it comes with a powerful utility program that maximizes printing speed. And it does all that for less than $60 per PC.

To find out more about The Logical Connection Jr., call 1-800-388-0362. Buy it, and we'll foot the bill for a free copy of Mace Performance,™ the $69 hard disk optimizer. Just write "sneaker network" on the registration card and return it to us. This is a limited-time offer, so step on it.



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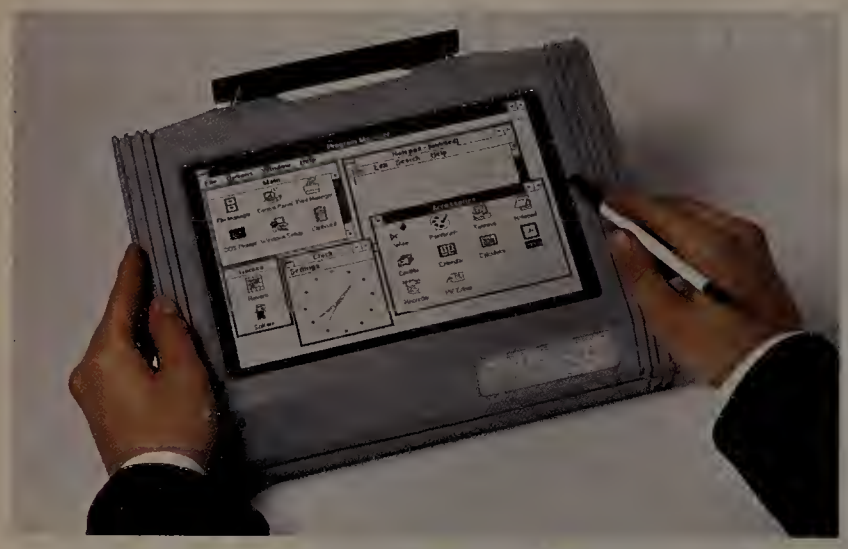
10049 N. Reiger Road, Baton Rouge, LA 70809
Technical Support: (504) 291-7283

Circle 235 on reader service card

Datellite 300

Have Pen, Will Travel: Notebook PC Driven by Touch-Screen



This pen-based PC has enough power and expandability for true keyboardless applications and a "touch screen" for fingertip computing.

If keyboardless computers are to take their place alongside their keyboard-equipped cousins, they must be more than novelties. Thanks to ample processing power and extras like a touch-sensitive screen that responds to pen or finger, the Datellite 300 is powerful but won't tie you down.

With a 20-MHz 386SX CPU, the $5995 Datellite 300 packs desktop-style punch. It lacks an internal floppy, but standard features include a math coprocessor socket, 2MB of memory expandable to 16MB on the system board, and a 40MB hard drive. There's no expansion chassis, but you can make connections through its SCSI port to a CD ROM drive or to external VGA monitors and keyboards through dedicated ports, and you may start asking yourself if you need your desktop.

At 6.6 pounds with battery, the Datellite is notebook light. Because the keyboard has been jettisoned, you rely mostly on the unit's VGA, 9-inch diagonal, backlit LCD screen with a touch-sensitive membrane that you tap with a stylus or your finger. You use the bundled DataSlate application generator to create applications for on-the-road data entry, and phrases for use in short memos, in concert with an on-screen "keyboard."

Driven by a finger instead of a mouse, the Datellite 300 runs DOS applications and even *Windows 3.0*, so you can build your applications under both environments. The company claims that programs from other slate computers, including Grid's GridPad, can be ported without much trouble.

You can't create long documents on the Datellite 300 screen yet because it lacks handwriting recognition software. However, MicroSlate promises to support the recognition capabilities of Microsoft's *Pen Windows* and Go Corporation's PenPoint when these products appear.

Options include an external 1.44MB floppy for $350, a 19ms internal 120MB SCSI hard drive for $1000, a $300 internal 2400-baud modem, and additional $198 battery packs, each rated at 4 hours. —*Mark Henricks*

IN BRIEF

Datellite 300
The Datellite 300 keyboardless system brings real desktop power to pen-based computing, along with a bundled application generator.

MicroSlate
9625 Ignace St., Ste. D
Brossard, Quebec
J4Y 2P3 Canada
514/444-3680,
514/444-3683 (fax)
Reader service no. 620

dBASE IV Server Edition

dBASE Finally Goes SQL—Sort of

Ashton-Tate has been talking about SQL support in *dBASE IV* for as long as it's been talking about *dBASE IV*. With the *dBASE IV Server Edition*, it's turning talk into action.

This version of *dBASE IV* lets you access SQL data off a server, in addition to working with standard DBF files. The initial release supports the Microsoft/Sybase *SQL Server*; Ashton-Tate promises that future versions will support other SQL dialects.

You can access SQL data through a combination of dBASE and SQL commands, either in programmed applications or interactively at the dot prompt. But that's as easy as it gets; *dBASE*'s excellent query-by-example data-retrieval method doesn't work on server-based data. And even when you've given up on menus and are programming your queries, you can't use such familiar dBASE commands as FIND and LIST WHILE with SQL tables.

What you can use is a hybrid language that combines the very different dBASE and SQL languages. For instance, you can use dBASE variables and functions in SQL statements, gaining more freedom than SQL itself allows. Other enhancements let you exploit SQL features—unheard of in *dBASE*—such as triggers and stored procedures that control the way data is written in a multiuser environment. Another feature lets you manipulate SQL data one row at a time, emulating *dBASE*'s record orientation.

dBASE IV Server Edition is by no means a flawless integration of two very different ways of handling data, but for the time being, if you're committed to Ashton-Tate *dBASE* and wish to move on to *SQL Server*, it's all you've got.

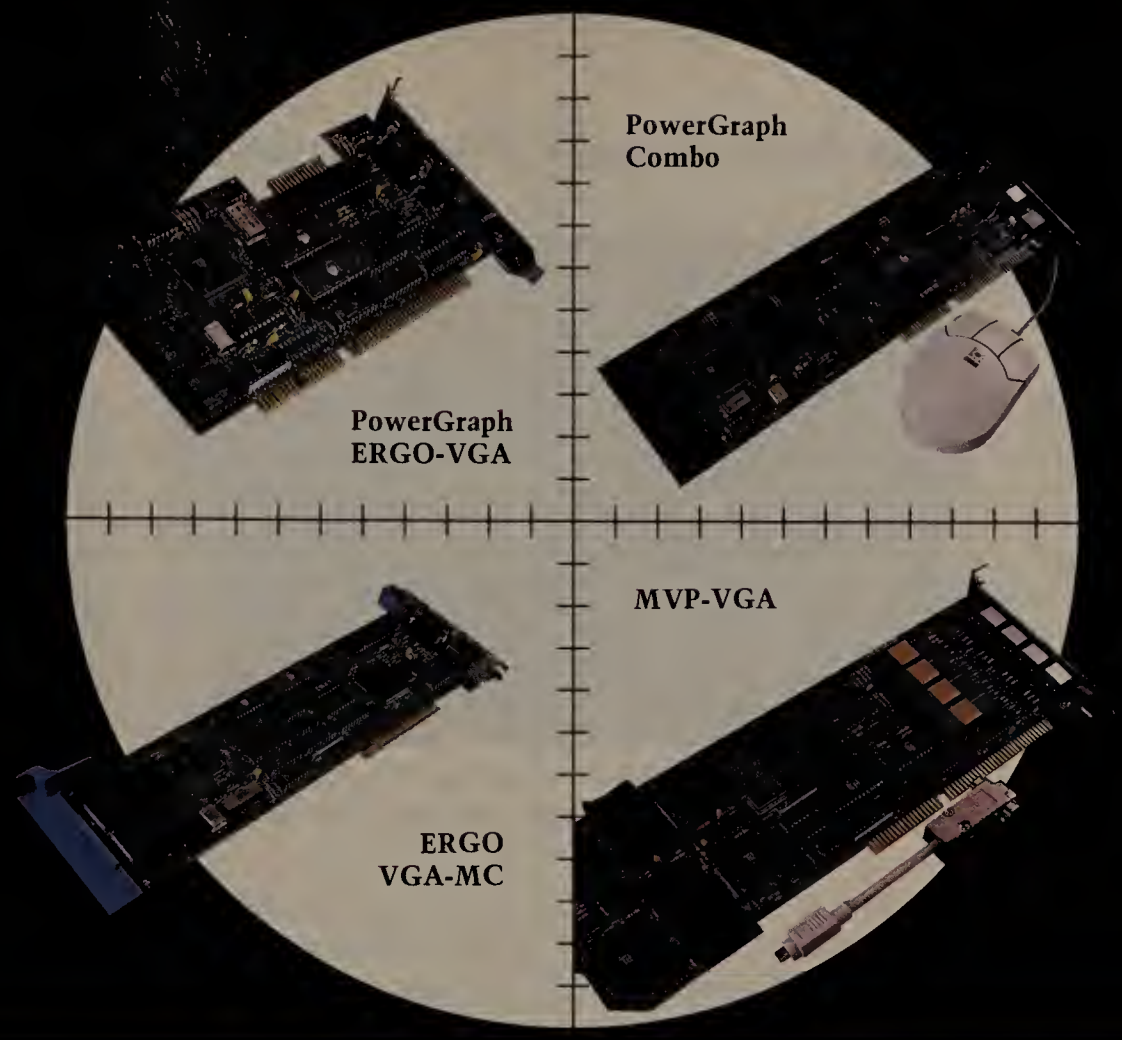
dBASE IV Server Edition requires DOS 3.1 or a later version, a 286 or more powerful computer, and 640K of standard memory plus 1MB of extended memory. The program can take as little as 100K of standard memory, running the rest in extended to give you plenty of room for memory-resident packages and network drivers. It retails for $1295 for the 3-user version and $7995 for the 20-user version. —*Lincoln Spector*

IN BRIEF

dBASE IV Server Edition
This LAN-based product lets you reach out and touch your SQL data—although not quite as easily as you can tap your *dBASE* files.

Ashton-Tate Corp.
20101 Hamilton Ave.
Torrance, CA 90509
213/329-8000,
213/538-7998 (fax)
Reader service no. 624

Set Your Sights on Simply The Best



Since 1981, STB has been shooting down the competition with innovative expansion products for PCs. In that tradition, STB presents four new Super VGA Power Peripherals.

PowerGraph ERGO-VGA

- High screen refresh rates for "Flicker-Free" operation
- InfoWorld Review Top Finisher, April, 1991

BUYERS ASSURANCE SEAL InfoWorld RECOMMENDED PRODUCT

PowerGraph Combo

- Super VGA, disk controller, serial and parallel ports and mouse on one card
- Logitech MouseMan included

ERGO VGA-MC

- Higher resolutions and High Color Super VGA for Micro-Channel Systems
- High screen refresh rates for "Flicker-Free" operation

MVP-VGA

- 2 or 4 Super VGA video ports on one card
- Windows and OS/2 multi-screen drivers available

All video cards in the PowerGraph family use the same high-performance graphics chip to insure software compatiblity. They provide resolutions up to 1024 X 768 and are compatible with the Video Electronics Standards Association (VESA) standards. In addition, all boards provide ergonomic, flicker-free operation in many video modes.

PowerGraph family options allow each of the adapters to display bit-mapped images using up to 32,768 colors, or to greatly enhance the appearance of fonts and vector drawings using sophisticated anti-aliasing techniques.

You Can't Miss With STB Power Peripherals

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(214) 234-8750

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STB

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Circle 243 on reader service card

Hayes Pocket Edition 2400

Downloading Files or Faxes More Cheaply at Home or Away

Being on the road doesn't mean you're cut off from your home and office PCs and fax machine. Hayes has created a 3-ounce, 3-inch modem that you can easily slip into the pocket of your coat, your laptop carrying case, or your briefcase—and it lets you hook up to your own laptop or a PC you find at your destination. Moreover, the Hayes Pocket Edition 2400 comes in at $179—a bargain compared with the $300 price tags of some competitors.

This diminutive 2400-baud modem is big on ease of use thanks to the friendly directories and keyboard macros in the Smartcom EZ software.

The Pocket Edition proves an even smarter buy if you take advantage of its bundled *Smartcom EZ* software to send and receive faxes through an information service such as MCI while on the road. This method of faxing costs less than $1 per page instead of the $5 a page you pay at some hotels. Faxing from your own computer is more private and assures you of more legible transmissions. If the line you are trying to reach is busy, most services will keep trying. *Smartcom EZ*'s phone directory comes with the numbers of MCI, CompuServe, and other popular mail services.

Smartcom EZ also contains other friendly features like the ability to dial and answer data transmissions from numbers in your own personal phone directory, an unlimited number of keyboard macros, and the ability to connect directly to a mainframe or mini. You also get on-line help.

Using an XMODEM protocol, *Smartcom EZ* steps down data speeds from 2400 baud to 300 baud as necessary. If XMODEM doesn't have enough error correction for your tastes, you can get a ZMODEM protocol by upgrading to Hayes's *Smartcom Exec* modem software. (The regular $55 upgrades to *Smartcom Exec* are only $35 through July 31.) However, even *Exec* lacks MNP-5's more powerful compression and error correction capabilities.

The Pocket Edition comes with a 6-foot telephone cord, an 18-inch serial cable, and a carrying case. Unlike most of its rivals, it runs completely off the power from telephone lines and the PC, so it requires neither battery pack nor electrical outlet. —*Susan Lusty*

IN BRIEF

Hayes Pocket Edition 2400

This pocket-sized modem makes it practical to send and receive data and faxes from any PC on the road.

Hayes Microcomputer Products, Inc.
P.O. Box 105203
Atlanta, GA 30348
800/874-2937,
404/441-1617,
404/449-0087 (fax)
Reader service no. 630

Accpac Simply Accounting

Multitasking Accountant: The Better to Open the Books

Thanks to the *Windows* environment's multitasking and graphical interface, you now can get a better look at the books, and more control over your company's finances, in Computer Associates' long-running integrated small-business package, *Accpac Simply Accounting*.

You can navigate easily among *Simply Accounting*'s general ledger, accounts payable, accounts receivable, inventory control, payroll, and job cost modules, as well as capitalize on the close match between on-screen display and printout. For example, when paying a bill, you get a copy of the printed check on screen. Pop-up lists also are available throughout the program for quick reference to information on employees, customers, or vendors.

Unfortunately, *Simply Accounting* doesn't support the environment's other high-end capabilities, such as Dynamic Data Exchange (which allows you to funnel data to and from other *Windows* applications).

Owners of Computer Associates' other entry-level accounting package, *Accpac Bedford*, can move over to the $199 *Accpac Simply Accounting* for $100. A free conversion utility transfers all *Bedford* files to *Simply Accounting*'s *Windows*-based format.

Accpac Simply Accounting requires at least a 286 with 1MB of RAM, *Windows 3.0*, and an EGA monitor, but a 386SX with 2MB or more is recommended.

Purchasers of *Simply Accounting* get two free calls to Computer Associates' technical support line upon registering the product. An extended support plan is available for $99 ($75 if purchased within 30 days of registering the product) and includes four toll-free technical support calls and free upgrades for one year. —*Roberta Furger*

IN BRIEF

Accpac Simply Accounting

WINDOWS Get a better look at your books with this Windows-based integrated package—which also makes your books look better.

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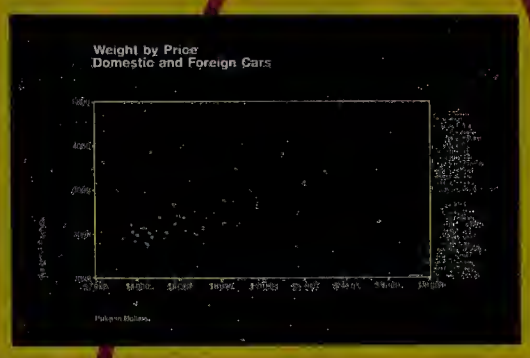

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Norton Backup for Windows

Look Ma, No-Hands Backup

Backing up makes the most of *Windows* multitasking. Not only does a *Windows* version of *Norton Backup* allow you to stay in *Windows* while you back up, *Norton* does the job in the background, leaving you free to do other tasks.

Since the program uses a direct memory access (DMA) channel instead of going through the CPU, it receives a real speed boost. For example, we backed up 42MB in only 20 minutes—to 1.2MB floppy disks!

You also can back up to another hard disk, a network server, a Bernoulli drive, or any DOS device, and you can schedule *Norton Backup* to do its job even when you aren't there.

Unfortunately, the first release of *Norton Backup for Windows* doesn't support tape backup systems, although Symantec says that capability should be available in an upgrade due out this fall.

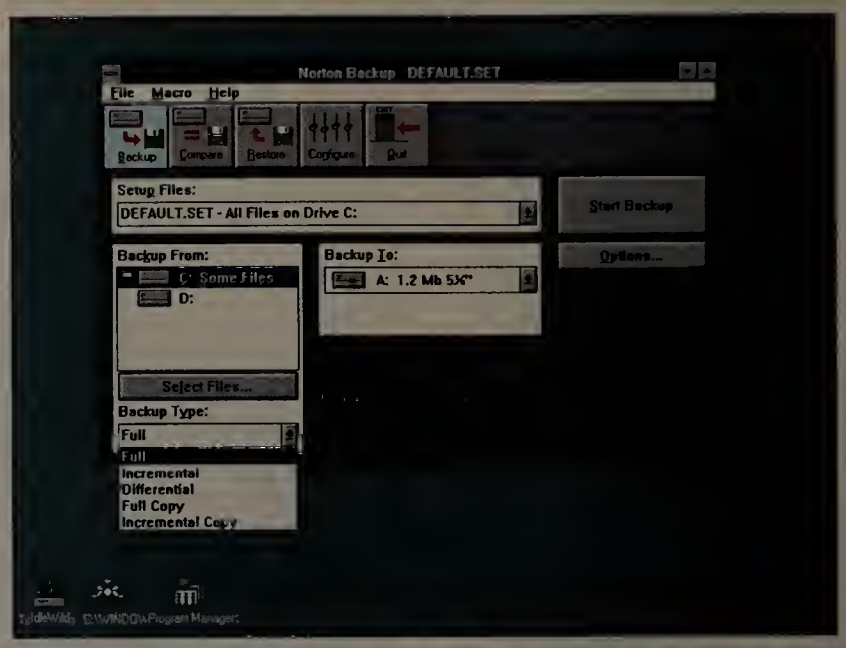
Everything else you would expect to find in a backup program is provided. You can perform both full and incremental backups. You can save your setup files for future backups, specifying the file types to back up by extension, date, and a number of other characteristics.

The program provides an attractive directory tree for selecting and excluding specific files. You can even view file contents on the fly to determine whether you want to include a specific file in the backup process.

But the slickest thing about *Norton Backup for Windows* is the interface. The program implements the *Windows* interface completely, with nicely designed scroll boxes, 3-D push buttons, and the like.

Operations are all point and shoot. The automated install routine, for example, lets you select a different drive for installation by pointing to a drive icon instead of typing its name. And every step of the way, *Norton Backup* gives you complete information about the operation that's in progress.

The program works on NetWare (version 2.12 or later) and *LAN Manager* networks and costs $129. —*Patrick Marshall*



A true Windows product, this utility from Norton lets you back up in the background and offers easy menu navigation with drop-down menus.

IN BRIEF

Norton Backup for Windows

WINDOWS You don't have to leave *Windows* to back up, and you don't have to watch the operation.

Symantec Corp.
10201 Torre Ave.
Cupertino, CA
95014-2132
800/441-7234,
408/252-4694 (fax)
Reader service no. 622

ZyIndex for Windows 1.0

How to Find Anything in Windows

The old text-retrieval standby *ZyIndex* works like magic to sort and retrieve text files speedily, using whatever keywords you can recall. But it's always required an irksome routine of regular file indexing. The new *Windows* version of *ZyIndex* cuts through that bother by performing updates in the background while you go about your other business (and you can program *ZyIndex* to do this automatically at a given time each day or week).

In making the move to *Windows*, the already comprehensive *ZyIndex* gains new benefits while retaining a fairly modest 2MB memory requirement. *ZyIndex for Windows* can search on date ranges and perform *quorum searches*—that is, display files that contain, say, three terms out of a possible five. It also does away with the DOS version's file limitation: This program can search as many files as you can cram onto your hard disk.

ZyIndex enables you to write two lines of search conditions and use wild cards for a fuzzy search. You can set up Boolean conditions, and you can even conduct synonym searches using the program's on-line thesaurus.

ZyIndex's speed comes at a cost. The program needs to generate and regularly update an index of your word processing files. The index usually requires 20 percent of the volume of the original files, meaning that indexing 20MB of word processing files can require another 4MB of disk space.

A few niggling limitations mar the program's otherwise powerful set of features. Though *ZyIndex for Windows* can index and search pretty much any word processing file, your spreadsheet, data base, and desktop publishing files remain out of reach unless you save them in ASCII format. And the *Windows* program lacks DOS-based *ZyIndex Plus*'s report generator—though this is a quibble for a program that costs only $395. —*Matthew Lake*

IN BRIEF

ZyIndex for Windows 1.0

WINDOWS The Windows version of ZyLab's text-retrieval software offers background indexing and more powerful searches.

ZyLab Corp.
100 Lexington Dr. #201
Buffalo Grove, IL 60089
800/544-6339,
708/459-8054 (fax)
Reader service no. 625

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J. D. Power and Associates just released these results from its first ever computer industry Customer Satisfaction Index for PCs in Small to Medium Size Businesses. And if you'll pardon any immodesty, we're proud to share them with you. To find out more impressive facts about Dell, see the following pages.

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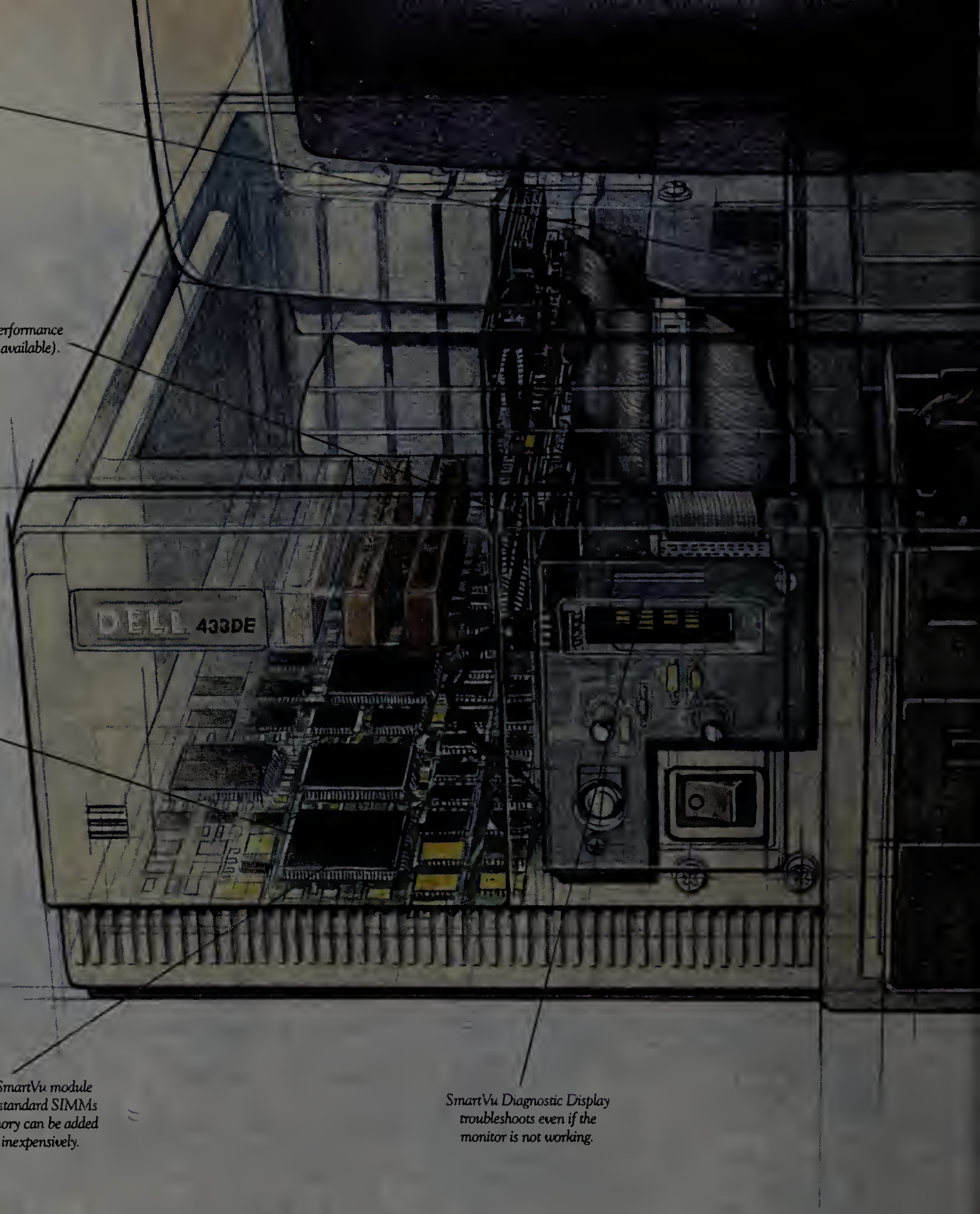

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SYSTEM INCLUDES VGA COLOR PLUS MONITOR, 100 MB HARD DRIVE, 4 MB RAM.*

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The Dell 320N 20MHz i386™SX system includes VGA LCD, 40 MB Hard Drive, 1 MB RAM.

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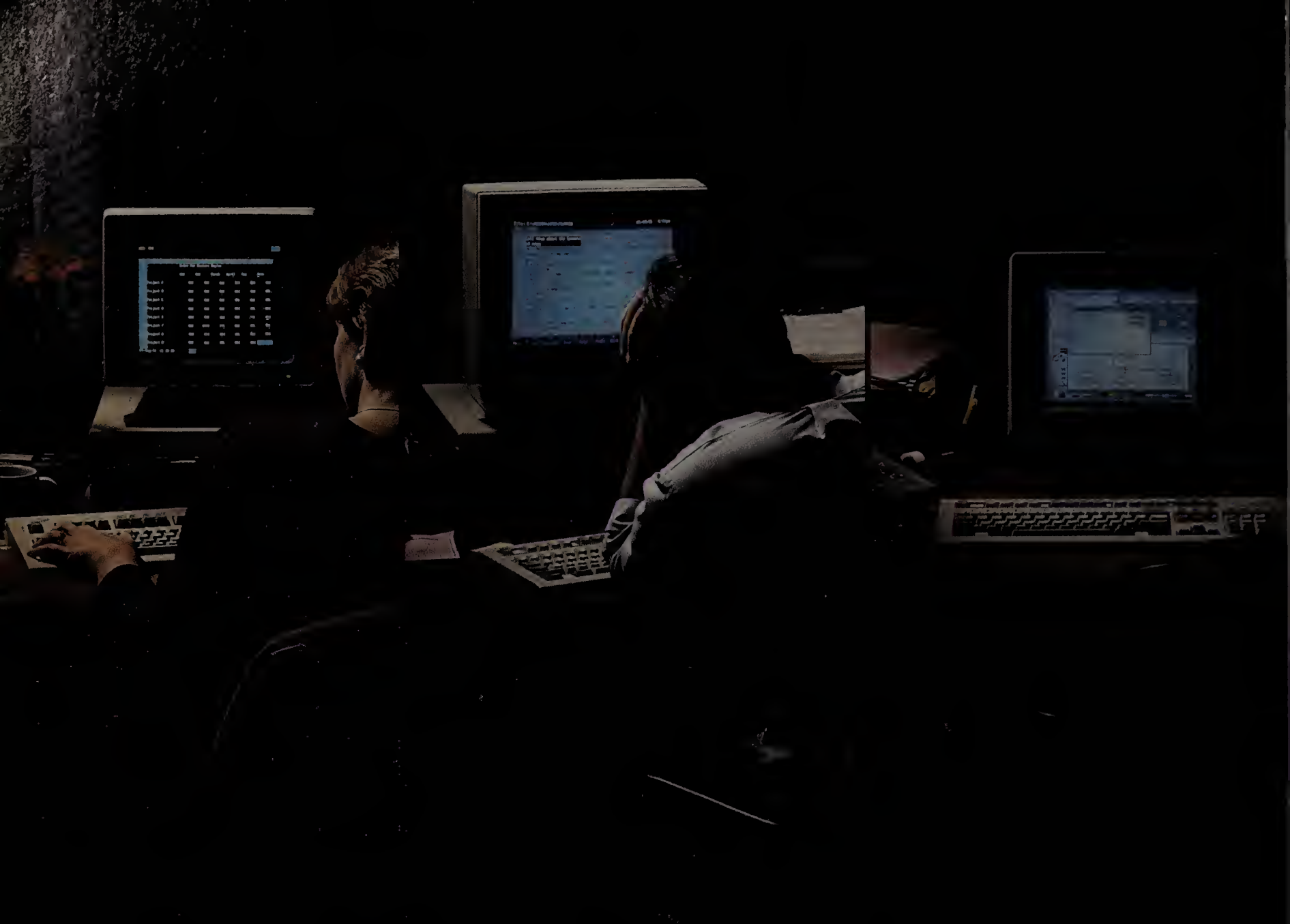

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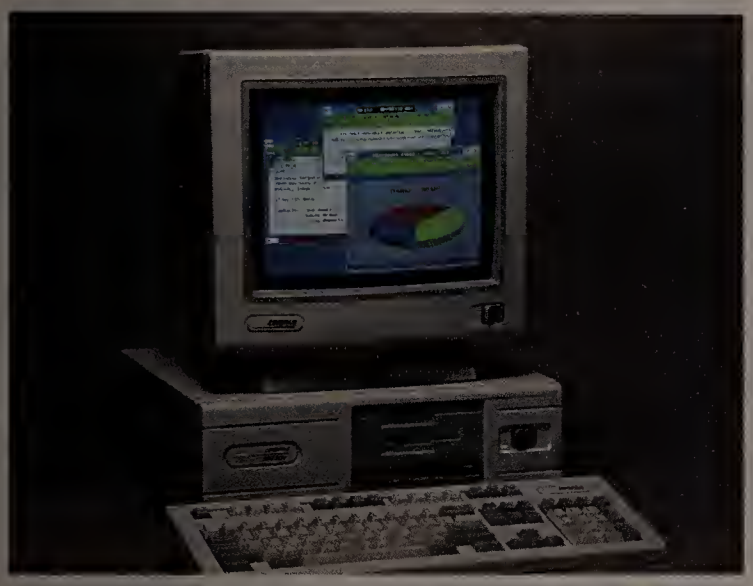


Compaq's new color monitor complies with the Swedish MPR 1990 electromagnetic emissions guidelines.

Compaq Computer has added a color monitor that complies with the latest Swedish electromagnetic emissions guidelines. The Reduced Emissions Video Graphics Color Monitor reduces extremely-low-frequency (ELF) emissions, very-low-frequency (VLF) emissions, and on-screen electrostatic potential. The 14-inch VGA monitor is 799, $100 more than Compaq's standard Video Graphics Color Monitor. A $299 Video Graphics Monochrome Monitor delivers the same emission reductions and replaces the existing monochrome monitor. Compaq Computer Corp., 20555 State Highway 249, Houston, TX 77070-2698; 713/370-0670.

Reader service no. 637

Microsoft Mail 2.1

WINDOWS After purchasing Consumer Software's *The Network Courier,* Microsoft added more flexible configurations and is making the upgraded product, retitled *Microsoft Mail,* available free through August 31 to all *Network Courier* users. A *Windows* program, *Microsoft Mail 2.1 for PC Networks* supports a wide array of messaging gateways, including one to AppleTalk networks, and all users (not just network managers) can call product technical support. A *Microsoft Mail Server* with software for a post office, message transfer between servers, and remote user access is $695. Workstation License Paks are available starting at 5 for $395. Microsoft Corp., One Microsoft Way, Redmond, WA 98052-6399; 800/227-4679, 800/426-9400, 206/883-8101 (fax).

Reader service no. 634

Data Junction 4.0

This utility for converting data base, spreadsheet, word processing, and accounting data now recognizes more formats and offers more conversion options. The $99 Standard Edition converts ASCII, *dBASE, 1-2-3, askSam,* and *Q&A,* as well as *WordStar, Word,* and *WordPerfect* mail merge files. The $199 Professional Edition adds *R:base, Paradox, DataFlex, DataEase, SuperCalc, Excel 2.*x, mainframe/binary/EBCDIC, *Btrieve,* and *c-tree* files. The Advanced Edition retails for $299 and adds *Oracle, Informix,* and *C-ISAM* files. Upgrades for all of the versions cost $69. Tools & Techniques, Inc., 1620 W. 12th St., Austin, TX 78703; 800/444-1945, 512/482-0976 (fax).

Reader service no. 635

ACT Network Version

A network version of Contact Software's *ACT 2.0* incorporates record locking so network users can share common contact data bases. The *ACT Network Version* lets you maintain private as well as public schedules for contacts and set your own data base defaults, menus, and field labels. But all users on a network can share common letters, memos, reports, and forms. *ACT Server Plus One* sells for $595; the 5-user *ACT Network Version* sells for $1295. Standalone users can upgrade to the server version for $445 and to the 5-user pack for $995. Software Int'l, 1625 W. Crosby Rd. #132, Carrollton, TX 75006; 214/418-1866.

Reader service no. 639

Expense It 2.0

This version of *Expense It* lets you share your expense report data with several popular accounting systems, including *DacEasy* and *Quicken,* as well as take data down from the Sharp Wizard pocket organizer. Data transfer is made possible by *Expense It*'s multiple General Ledger code assignments for each expense. The program lets you add expenses in any order and print to its standard expense form or your company's form. On the Go Software, 330 Washington St. #400, Marina Del Rey, CA 90292; 800/252-9955, 213/578-2095 (fax).

Reader service no. 638

The Complete Communicator 2.6

Version 2.6 of The Complete Communicator, a communications hardware/software combination, simplifies installation of the fax/modem/voice-mail board and supports high memory to facilitate background faxing. You can scan and send legal-sized documents and include logos and signatures in faxes. A copy of the *Microsoft Works* integrated productivity program is bundled with the $699 board; upgrades are available for $49. The Complete PC, 1983 Concourse Dr., San Jose, CA 95131; 408/434-0145, 408/434-1048 (fax).

Reader service no. 640

For more information about any product, contact the manufacturer or circle the number on the reader service card.

Screen Gems: Super-VGA Boards

Select the right souped-up VGA board from the ten reviewed here, and enjoy a sharper, flicker-free image with a magnitude more colors.

TJ Byers

Whether you're tired of your old monochrome display or you're finding plain EGA or VGA too confining, now is the perfect time to upgrade your display system to super VGA. For just a few hundred dollars, a new display board can dramatically improve the look of your screen and take the strain off your eyes by reducing screen flicker.

At all-time low prices, most of today's video boards can give you more pixels than plain VGA's 640 across by 480 down. What makes super-VGA boards super is their two extra modes, 800 by 600 and 1024 by 768. With these higher resolutions, *Windows* will be able to fit more windows on the same monitor, and spreadsheet users can view more cells with less scrolling. And wait till you feast your eyes on graphics at 1024 by 768 with 256 colors—they're not photograph quality, but they come remarkably close.

The only drawback to running applications at these higher resolutions is slower performance. But unlike the last generation of super-VGA boards, this batch sacrifices remarkably little speed—typically less than 10 percent—a trade-off that most users seem perfectly willing to live with.

Many super-VGA boards offer another bonus: ergonomic benefits in the form of reduced flicker. Much of the eyestrain and fatigue you feel after staring at the screen for long periods can be traced to flicker from two sources—slow *refresh* and *interlaced scanning*. Refresh refers to the number of screens the board draws per second; the more the better. Interlaced scanning—which is an issue only at 1024 by 768—is a cost-saving technique that unfortunately increases sensitivity to flicker.

Many super-VGA boards provide noninterlaced scanning and a screen refresh rate of 70 or 72 Hz—an eye-pleasing combination that can increase productivity. If your monitor supports these enhancements, you'll notice the benefits immediately. Even if it doesn't, since these features add virtually nothing to the price, we recommend selecting a board that offers them should you switch to a better monitor (see the sidebar "Make Your Monitor Flicker Free").

PIERRE-YVES GOAVEC

Getting Beyond VGA

The secret to super-VGA resolutions and colors lies in the software drivers that come with each board. A driver enables a board to work with a specific application at a fixed super-VGA resolution; you need a separate driver for each application and each super-VGA mode. Without one, you're stuck with plain old VGA.

Most of the boards reviewed here provide an excellent selection of super-VGA drivers for the most popular business applications, including *1-2-3* and *Windows*. The advantage for *Windows* users is loading only one 800 by 600 or 1024 by 768 driver to run all *Windows* apps at that resolution. For text applications, most boards also have a 132-column mode, giving you more work space.

You can install a super-VGA board in virtually any PC, but some boards make the job easier than others. Those that force you to set jumpers or DIP switches are the most difficult. If you're upgrading from a monochrome display or if your PC has built-in VGA, you may have to set DIP switches or jumpers on the PC's motherboard too. However, walk-through instructions in each board's manual take much of the sting out of installing the hardware. In most cases, you can plug and play, but only two boards—ATI's VGA Wonder XL and Boca's SuperVGA—can promise that for any situation.

To help you select the best super VGA at the lowest price, we probed and prodded ten super-VGA boards. We checked out their screen flicker and benchmarked them for performance. In the speed tests, we found little to differentiate between the boards at 640 by 480 resolution, so we confined our benchmarks to 800 by 600 and 1024 by 768. Even then, only the *AutoCAD* tests—and to a lesser degree the *PowerPoint* tests—split up the pack. We also assessed the boards' ease of installation and the manufacturers' warranty and support.

We were pleasantly surprised to find that the software compatibility problems that beset earlier super-VGA boards were no longer in evidence. Two of the boards in this roundup, the ATI VGA Wonder XL and the Boca SuperVGA, merit a Best Buy. A couple of other boards are notable smart buys, and as a whole it's hard to go wrong.

Super VGA: The Eyes Have It

Super-VGA boards give you two extra-sharp resolutions and 256 colors instead of 16. To take advantage of these enhancements, the board you buy must include software that specifically supports the application you want to use.

ATI VGA Wonder XL

BEST BUY

PROS: Switchless setup, menu-driven software installation, mouse included

CONS: Middle-of-the-road performance

With menu-driven hardware and software driver installation, the ATI VGA Wonder XL is the easiest board to install and configure. Furthermore, it comes with a mouse port and a three-button mouse yet sells for a mere $259 on the street with 512K of RAM—making it a clear Best Buy.

The VGA Wonder XL is the only board in this roundup to provide flicker-free 72-Hz screen refresh at all resolutions, even with a large, expensive, flicker-free monitor.

If you use *PowerPoint* or *AutoCAD*, however, you might want to consider a faster board. In our *PowerPoint* speed tests, the VGA Wonder XL fell far back in the field. In the *AutoCAD* benchmarks, it consistently ran in the middle of the pack.

The ATI VGA Wonder XL is an excellent board to have around as flicker-free high-resolution monitors get cheaper. It's a truly switchless board and has the smoothest driver installation of the bunch—a boon for those who frequently switch between DOS applications. It's a distinct Best Buy, especially if you don't already have a mouse.

Boca SuperVGA

BEST BUY

PROS: Lowest price, switchless hardware installation

CONS: Menuless driver installation

With a street price of $160 with 512K of RAM, Boca's SuperVGA is the bargain of the roundup. Even at this price, the board doesn't skimp on drivers, and it's the only one besides the ATI with switchless installation.

The SuperVGA delivers flicker-free 72-Hz screen refresh at all resolutions except 1024 by 768. This makes the board a cost-effective match for top-quality 14-inch multiscan monitors that can run at 72 Hz at 800 by 600, such as Seiko's CM 1440.

As with the ATI, you can plug and play the SuperVGA—even on a networked machine. Without its rival's menu-driven driver installation, however, switching between DOS applications in extended modes will require a bit more work.

For a board with the lowest price in town, the SuperVGA shows a lot of spunk and sparkle. It was a bit faster than the ATI in the *AutoCAD* tests, hardware installation is just as easy, and it even comes with a five-year warranty. Unless you plan to buy an expensive monitor that's flicker free at 1024 by 768, this is the Best Buy board for you.

Buying Smart

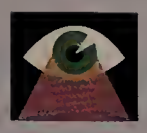
Good news! Unlike the VGA boards of yore, today's super-VGA boards seem devoid of serious compatibility problems with either hardware or software. They're also considerably faster. If you want to use high-resolution super-VGA modes, though, the board you buy must specifically support the application you use.

SOFTWARE SUPPORT

Without a special super-VGA software driver for your application, you'll see that application at standard 640 by 480 VGA resolution with 16 colors. All the super-VGA boards in this review come with drivers that enable them to run at the two super-VGA resolutions—800 by 600 and 1024 by 768—with *Windows, 1-2-3, AutoCAD, WordPerfect,* and *Ventura.* Other boards add support for *Word, WordStar,* OS/2, and more. Make sure the board you buy has the driver you need.

Colors are just as important as a sharp image, and whether you get 16 or 256 depends on the driver and the amount of RAM on board. If you have a graphics-intensive task in mind—say, previewing a color slide in *PowerPoint* or working with more than 16 layers in *AutoCAD*—a 256-color image at a full 1024 by 768 may be in order. To get that many colors at that resolution, you'll need 1MB of RAM—and some boards hold no more than 512K.

Note that super-VGA life is easiest under *Windows.* Load a single super-VGA *Windows* driver, and that's it. Along with the environment itself, all *Windows* applications benefit from the enhanced resolution and colors.



FLICKER-FREE SUPPORT

The latest, greatest feature of these boards is flicker-free operation. Standard VGA boards drive a monitor at 60 screens per second (or 60 Hz), creating a perceptible flicker. You can plug all but one of these boards into a standard multiscan such as the NEC MultiSync 3D and run the monitor in standard VGA resolution at 70 or 72 Hz. That's fast enough to prevent most users from noticing the flicker, making the screen easier on the eyes.

The same boards that give you flicker-free operation at standard VGA resolution can also offer that performance at 800 by 600—but for that you need a better multiscan, such as Seiko's CM 1440. Monitors of this type also perform 60-Hz noninterlaced scanning at 1024 by 768. Noninterlaced scanning reduces the user's ability to perceive flicker—but at 60 Hz, it's still noticeable.

Only the ATI VGA Wonder XL and the Genoa SuperVGA 6400A offer true flicker-free performance at 1024 by 768. You have to spend at least $1000 on the street to buy a monitor that can give you that. But by the end of this year, the price for monitors in this class may come down. Look for flicker-free performance at 1024 by 768 if you see a top-of-the-line monitor in your future.

EASE OF INSTALLATION

Ideally, installing a super-VGA board should be a plug-and-play operation. The ATI VGA Wonder XL and the Boca SuperVGA sense your hard-ware configuration and basically install themselves. But most boards require that you flip a couple of DIP switches or move a jumper, depending on whether a network board is present, how much RAM is installed, whether you opt for flicker-free performance, and so on.

Once you've installed the card, you need to install a separate driver for each application you want to use at super-VGA resolution. If you plan to soup up several applications, you'll need to switch drivers frequently; look for a board that offers menu-driven driver installation.

PERFORMANCE

We found little speed difference between boards with most of the applications we tested. The exceptions were in the *AutoCAD* and *PowerPoint* benchmarks. If you plan on using either of these applications, pay close attention to the two tests.

The biggest performance variance shows up between modes rather than between boards. Expect about a 10 percent performance hit when you upgrade from standard VGA resolution to 800 by 600, and an additional 5 percent when you switch to 1024 by 768. With an application like *PowerPoint* that actually uses 256 colors, expect another 5 percent slowdown in any mode when you switch from 16 to 256 colors.

SERVICE AND SUPPORT

Access to new drivers is a prime service issue for most super-VGA users. Being able to download the latest versions from an electronic bulletin board service is a great benefit. For installation problems, toll-free tech support is a big plus, and technical fax support is helpful for quick-fix answers.

Everex Viewpoint VRAM

PROS: Excellent Windows performance

CONS: Expensive; difficult installation

The Everex Viewpoint VRAM is harder to install and configure than most boards. Combine this with a $392 street price—the highest in the roundup—and you'll wonder whether the board's fast *PowerPoint* and *Excel* performance make the Viewpoint an appealing purchase.

One way of curbing the board's high price is to buy it configured with ordinary RAM instead of video RAM (VRAM); this can save you either $100 (for 512K) or $200 (for 1MB). The trade-off is a slight decrease in speed.

Installation can be difficult for two reasons: You have to install software drivers without a menu, and you may need to set both DIP switches and jumpers. Even when you follow the manual's instructions, you may need to make additional changes. During testing we had to reconfigure a hard disk controller card before the system would boot. Fortunately, the company's toll-free technical support proved extremely helpful.

It's unfortunate, though, that calling Everex's 800 number may be necessary. High price and potentially tricky installation make the Viewpoint less appealing than many.

Genoa SuperVGA 6400A

PROS: Flicker-free operation in all modes

CONS: No 1MB version, one-year warranty

The Genoa SuperVGA 6400A goes for a moderate $248 on the street and offers flicker-free 70-Hz screen refresh all the way up to 1024 by 768. With a RAM limit of 512K, however, you can enjoy that resolution with only 16 colors.

A growing number of *Windows* applications use 256 colors, allowing you to preview color slides and run monitor-based presentations. You can get 256 colors from this board—but only if you never go beyond 800 by 600. As for performance, the board fell well below the

Make Your Monitor Flicker Free

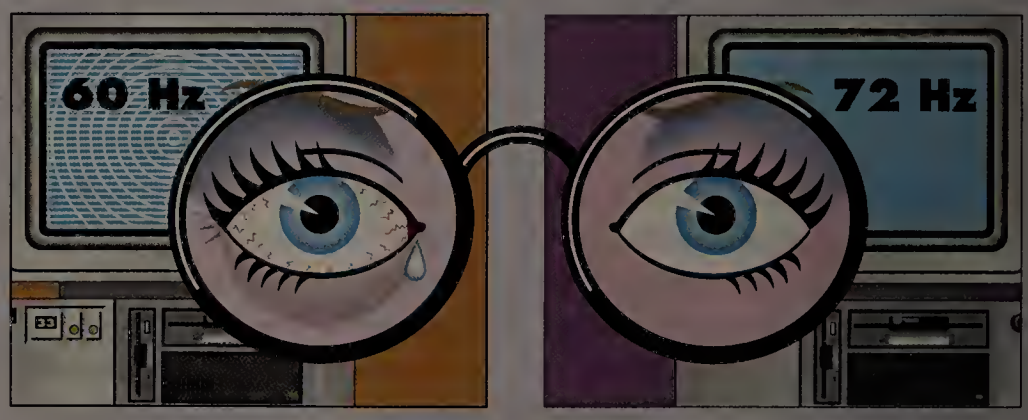
Eric Knorr

You've been staring at the screen for hours. Your eyes are so tired, the image on your monitor seems to be flickering. Well, guess what? It is.

Standard VGA monitors take one-sixtieth of a second to create a complete image of 480 lines. That may sound fast, but it's not quite fast enough to fool your eyes into seeing a perfectly stable image.

You probably wouldn't notice flicker on a screen displaying 60 screens per second (or 60 Hz) of text on a black background. But with a light background—typical of so many *Windows* applications—you can see it. Even if you don't notice, the flicker affects your eyes, causing them to strain and tire over time.

Studies show that the faster the screen refreshes, the fewer people sense flicker. Most of the super-VGA boards in this review can drive a monitor at either 70 or 72 Hz—welcome news for sore eyes.



You need the right monitor to take advantage of a super-VGA board's flicker-free performance. A standard VGA monitor won't do—it's fixed at 60 Hz. But many of today's color monitors are *multiscans*, which means their screen can be scanned at any speed within a given range. For example, any multiscan, including NEC's ever-popular MultiSync 3D, can be driven at 70 or 72 Hz at standard VGA resolution, 640 by 480. Many newer multiscans—not the 3D, however—can also run flicker free at 800 by 600.

If you want flicker-free performance at the top super-VGA resolution, 1024 by 768, be prepared to pony up some big bucks for the monitor. Fortunately, support for 70 or 72 Hz at any resolution costs next to nothing on the board side (the ATI VGA Wonder XL and the Genoa SuperVGA 6400A are the only boards reviewed to offer flicker-free operation at 1024 by 768). Better, the cost of high-resolution, flicker-free multiscans promises to plummet in the near future.

Super VGA: A Sharper Image for Less

Enjoy high resolution and up to 256 colors—provided the board you buy supports your application. The chart below shows resolution and colors for each.

● Yes
○ Na

	ATI VGA Wonder XL[1]	Boca SuperVGA	Everex ViewPoint VRAM	Genoa SuperVGA 6400A	Orchid ProDesigner II	Paradise VGA 1024	SigmaVGA Legend	STB PowerGraph Ergo-VGA	Trident Impact III	Video Seven VRAM II
Standard features										
Street price[2]	$259	$160	$392	$248	$304	$254	$253	$201	$172	$370
List price[2]	$349	$195	$499[3]	$272	$469	$469	$375	$265	$229	$499
Mouse port	●	●	○	○	○	○	○	○	○	○
Software support (colors available with maximum RAM installed)										
Windows 3.0										
640 x 480	256	256	256	256	256	256	256	256	256	256
800 x 600	256	256	256	256	256	16	256	256	256	256
1024 x 768	256	256	256	16	256	16	256	256	256	256
Ventura (GEM)										
800 x 600	16	16	16	16	16	16	16	16	16	16
1024 x 768	16	16	16	16	16	16	16	16	16	16
1-2-3										
800 x 600	0	0	0	0	0	16	16	0	0	16
1024 x 768	0	0	0	0	0	0	16	0	0	0
132 columns	16	16	16	2	16	16	16	16	16	16
WordPerfect										
800 x 600	16	256	16	16	16	0	16	256	16	16
1024 x 768	16	256	16	16	16	0	16	256	16	16
132 columns	16	256	16	0	16	16	16	16	16	16
AutoCAD										
640 x 480	256	256	256	16	256	16	256	256	256	16
800 x 600	256	256	256	16	256	16	256	256	256	16
1024 x 768	256	256	256	16	256	16	256	256	256	16
Flicker-free support										
At VGA resolution	●	●	●	●[4]	●	○	●	●	●	●
At 800 x 600 resolution	●	●	●	○[4]	●	○	●	●	●	●
At 1024 x 768 resolution	●	●	○	○[4]	○	○	○	○	○	○
Ease of installation										
Switchless setup	●	●	○	○	○	○	○	○	○	○
Menu-driven software driver installation	●	●	○	○	○	○	●	○	○	●
Service and support										
Warranty (years)	2	5	2	1	4	3	1	1	2	7
Toll-free tech support	●	●	●	●	●	○	○	●	●	●
Daily support (hours)	8.5	8.5	11	9	9	9	9	10	10	9
Drivers through BBS	●	●	●	●	●	●	●	●	●	●
Fax tech support	●	●	●	●	●	●	●	●	●	●
	BEST BUY	BEST BUY								

[1] The VGA Wander XL's predecessar, the VGA Wander, wan a Warld Class Award in 1989 and 1990. The current madel includes mause.

[2] With 512K RAM.

[3] With VRAM installed; $399 with RAM installed.

[4] Supparts 70-Hz refresh at this resalutian.

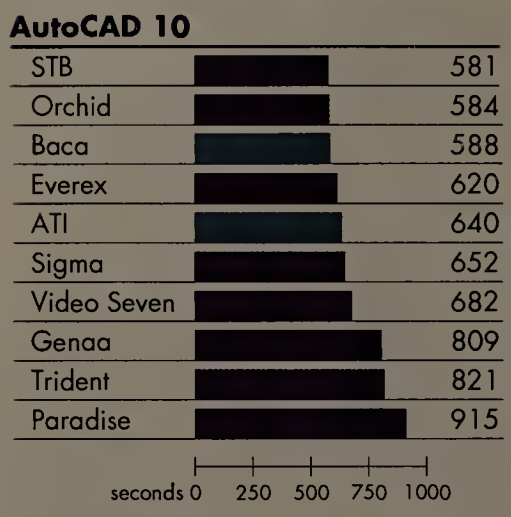
PC WORLD TEST REPORT

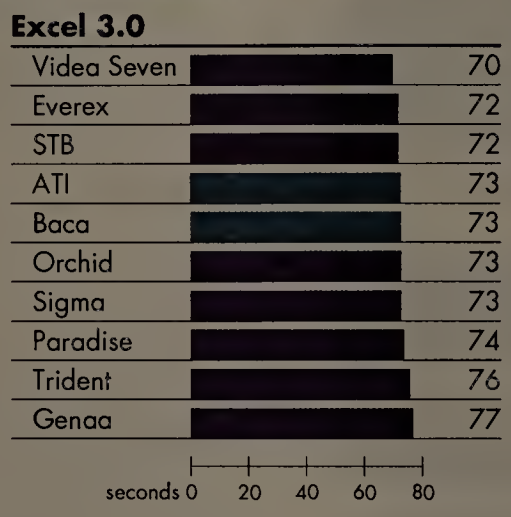
High Speeds for High Resolution

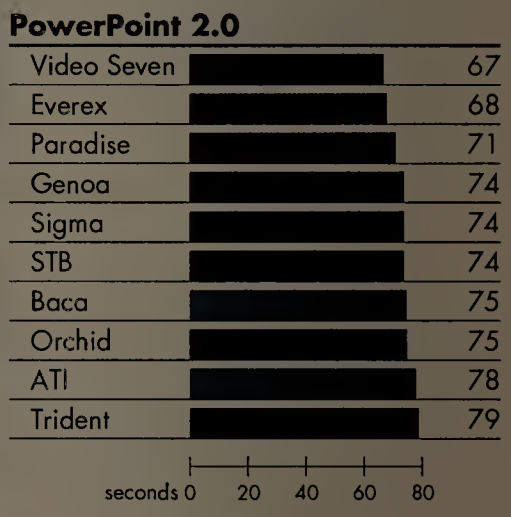
At standard VGA resolution, the boards reviewed showed few speed differences—they all did well. Even at 1024 by 768 and 800 by 600, the only real point spread showed up in the AutoCAD tests.

Best Buy

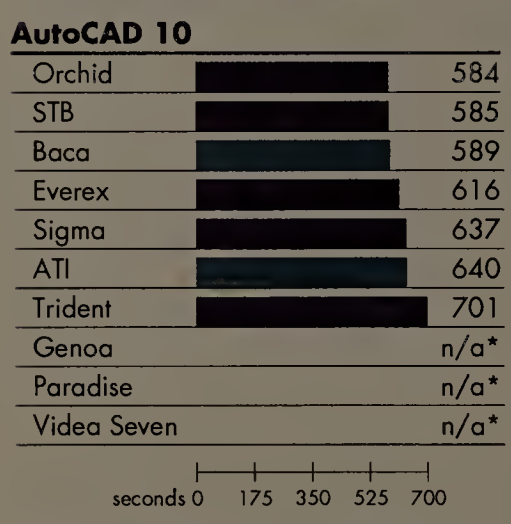
1024 x 768 resolution with 16 colors

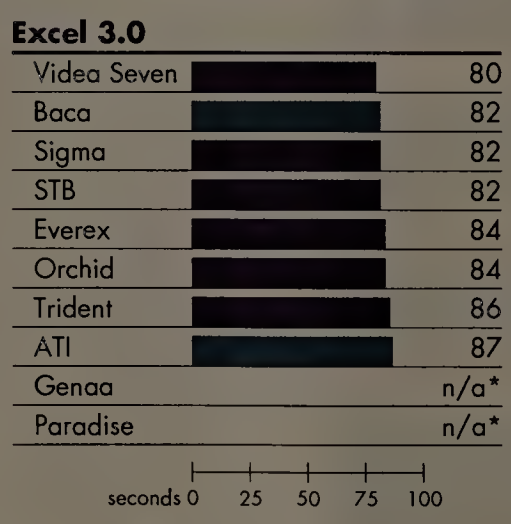


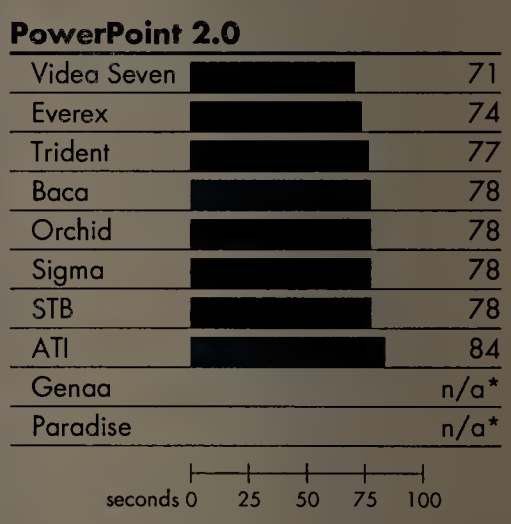




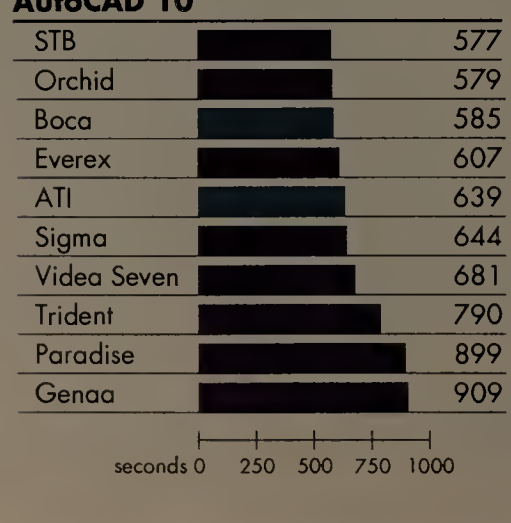
1024 x 768 resolution with 256 colors

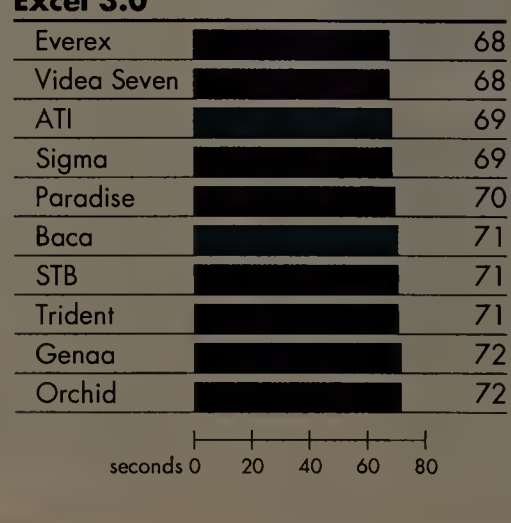


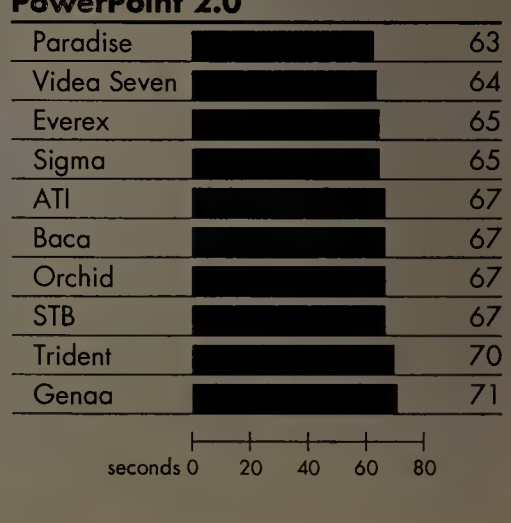




800 x 600 resolution with 16 colors







* No driver wos supplied for this resolution ond color level.

Methodology
We instolled ond tested the boords in o 20-MHz Compoq Deskpro 386/20e with 4MB RAM, on 80387 coprocessor, ond o 110MB hord disk; we used on NEC MultiSync 5D disploy. In our performonce benchmorks, we executed botch files using *AutoCAD 10* scripts, *Excel 3.0*, ond *PowerPoint 2.0*. Timing began when the mocro or script wos lounched ond ended when it wos completed. We tested the boards in the following modes: 1024 by 768 resolution with 16 colors, 1024 by 768 resolution with 256 colors, ond 800 by 600 resolution with 16 colors.

AutoCAD 10
We drow, redrow, zoom in on, pon right, pan left, ond zoom out of three seporote DWG files.

Excel 3.0
We lood o file, scroll ten verticol poges, jump to cell C5, chonge o volue, ond recalculate the worksheet. Then we open the groph ossociated with the worksheet, maximize it, wait 3 seconds to simulote viewing time, switch bock to the worksheet, send the cursor to the top of the worksheet, ond quit.

PowerPoint 2.0
We lounch o typical *PowerPoint 2.0* session, in which we lood o series of four slides, scroll through them, ond then jump back to the first slide.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

mean in both the *AutoCAD* and *PowerPoint* tests.

At 70 Hz, the SuperVGA 6400A displays two screens fewer per second than 72-Hz boards. But unless you have oscilloscopes for eyes, you won't notice the difference.

Genoa's warranty expires after one year, and the SuperVGA 6400A's speed won't thrill you. Flicker-free performance across all modes is this board's main selling point. If you want a flickerless 1024 by 768 image from a 16-inch monitor such as NEC's MultiSync 4D, this board and the ATI VGA Wonder XL are your only choices.

Orchid ProDesigner II

PROS: Fast AutoCAD performance

CONS: Expensive

The most outstanding feature of the Orchid ProDesigner II is speed—it tied for first place in the key *AutoCAD* tests. Other than that, the board has an average set of features and a fairly high $304 street price.

Like most boards in this roundup, the ProDesigner II offers flicker-free 72-Hz performance at all resolutions except 1024 by 768. That may limit your options, but on today's 14-inch multiscans, most people won't experiment beyond 800 by 600 anyway.

The board isn't quite plug and play, but unless a network board is present, you probably won't have to mess with the board's handful of jumpers. Driver installation involves issuing commands from the DOS prompt instead of simply choosing menu options.

Thanks to its speedy performance, *AutoCAD* users may want to consider this board seriously. In addition, by the time you read this, Orchid will be shipping a new version of the ProDesigner II (the IIs) that will list for $120 less and purportedly will offer the same speed, 70-Hz refresh at 1024 by 768, and a special upgrade that will support over 32,000 colors under *Windows*. These new features should make the ProDesigner IIs one of the hottest SuperVGA boards around.

Paradise VGA 1024

PROS: Easy hardware setup

CONS: No 1MB version, no flicker-free modes, slow AutoCAD performance

Like the Genoa SuperVGA 6400A, the Paradise VGA 1024 tops out at 512K—and at $254 on the street, it sells for about the same price. It's the only board in the roundup that won't refresh the screen at 70 or 72 Hz in any mode.

The board is easy enough to install; there are no jumpers to set, just two DIP switches. However, switching drivers could be simpler—you have to do it from the DOS prompt instead of from a menu.

The board includes drivers for all the usual applications, but the memory cap means you won't find any 256-color drivers for 1024 by 768 operation—a disappointment if you're a business graphics user interested in previewing slides. Furthermore, compared with the other entries, this board performs slowly with *AutoCAD*.

For beyond-VGA graphics, the Paradise VGA 1024 falls short. You can do better for less.

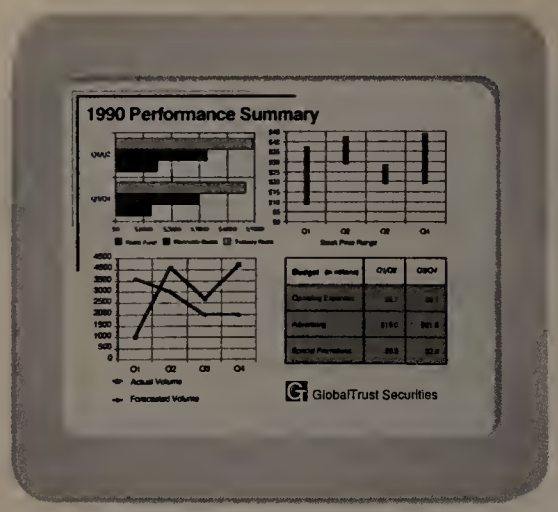
SigmaVGA Legend

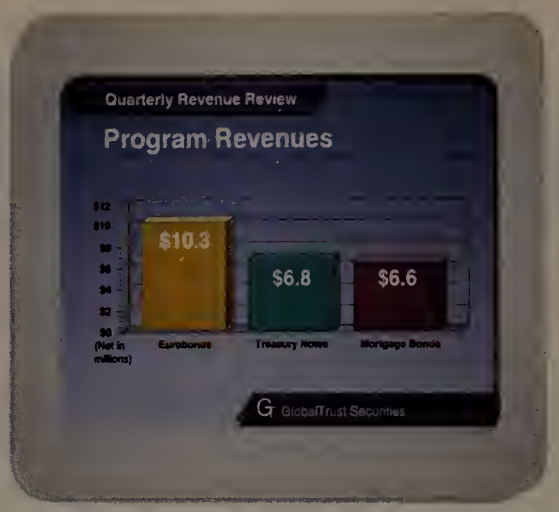
PROS: Easy driver installation

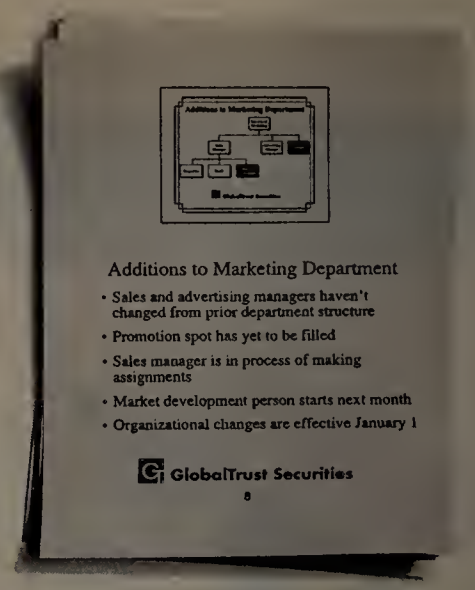
CONS: One-year warranty

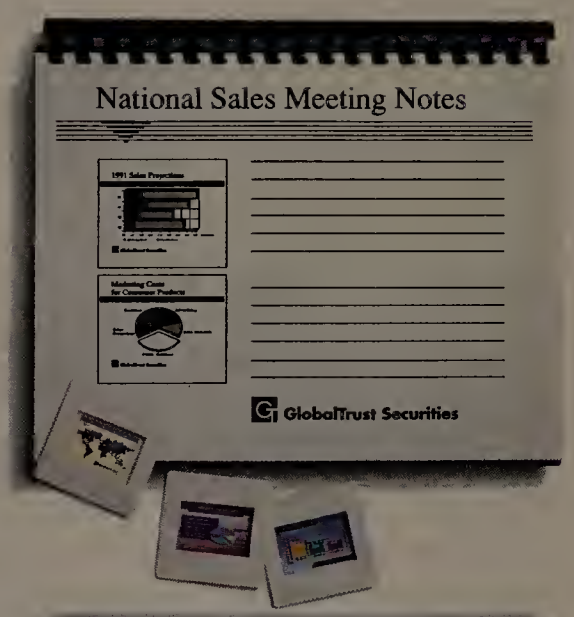
The SigmaVGA Legend has two things going for it: menu-driven driver installation and the second-largest assortment of software drivers in the roundup. Its shortcoming is a scant one-year warranty.

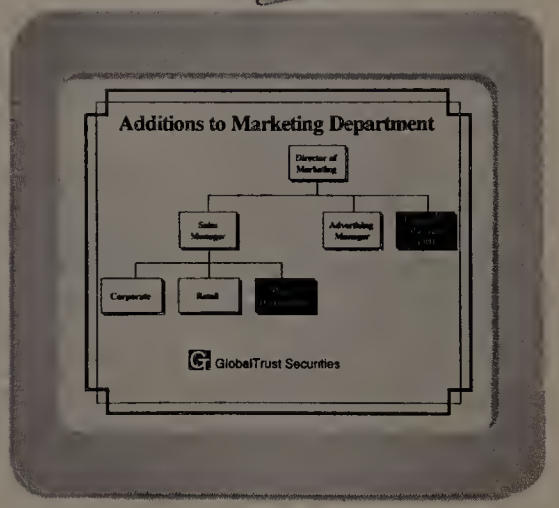
The Legend is one of three boards reviewed that have easy, menu-driven driver installation. And while hardware installation isn't completely switchless, it comes close. The only jumpers you have to set are for the 72-Hz screen











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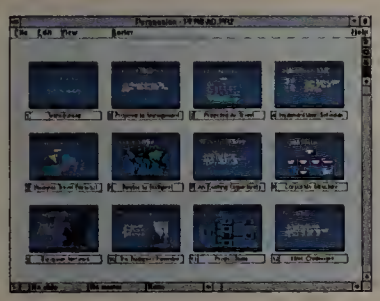

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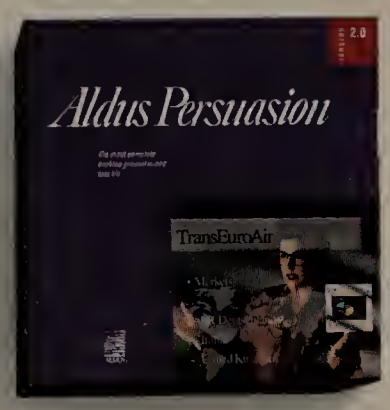

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refresh (which tops out at 800 by 600) and the interrupt jumper (if the board coexists with a network card).

Two things may limit this board's longevity. First, it's one of two boards that come with only a one-year warranty. Second, it won't support flicker-free 72-Hz refresh at 1024 by 768. When new low-cost 72-Hz monitors emerge, you won't be able to take full advantage of them.

All factors considered, this board falls squarely in the middle of the pack. Easy software and hardware installation and a moderate price earn the SigmaVGA Legend a solid recommendation. At press time, Sigma announced the Legend II, which promises faster operation as well as more colors or faster screen refresh rates for its various resolutions.

STB PowerGraph Ergo-VGA

PROS: Low price, fast AutoCAD performance

CONS: Menuless driver installation

At a street price of $201 with 512K of RAM, STB's PowerGraph Ergo-VGA is one of the three least expensive boards reviewed. It's an attractive buy, offering both fast performance and nearly switchless installation.

The PowerGraph tied for first place in the *AutoCAD* tests. CAD performance hounds should note that this board lists for $200 less than Orchid's equally speedy ProDesigner II.

As with the SigmaVGA Legend, you may have to move a jumper or two: one for 72-Hz screen refresh at 800 by 600, and the other to avoid conflicts with your network card. When you install drivers, there are no menus; you must do so from

EXECUTIVE SUMMARY

Looking Good Across the Board

The latest super-VGA boards offer sharp, flicker-free images and plentiful colors.

BEST BUY

No need to settle for the standard VGA image. At very reasonable prices, all the boards here offer extended resolutions of 800 by 600 and 1024 by 768, and many offer 256 colors at all resolutions. Most also raise the number of screens per second from 60 to 70 or 72, reducing flicker and eyestrain. Best Buys **ATI VGA Wonder XL** and **Boca SuperVGA** combine ease of installation with flicker-free performance and good prices. The **Video Seven VRAM II** and the **STB PowerGraph** also make attractive buys.

	ATI VGA Wonder XL	Boca SuperVGA	Everex Viewpoint VRAM	Genoa SuperVGA 6400A	Orchid ProDesigner II	Paradise VGA 1024	SigmaVGA Legend	STB PowerGraph Ergo-VGA	Trident Impact III	Video Seven VRAM II
Software support	Excellent	Excellent	Excellent	Foir	Excellent	Foir	Excellent	Excellent	Excellent	Good
Flicker-free support	Excellent	Good	Good	Excellent	Good	Poor	Good	Good	Good	Good
Ease of installation	Excellent	Excellent	Fair	Good	Good	Good	Good	Good	Good	Good
Performance	Good	Good	Excellent	Fair	Excellent	Foir	Good	Good	Foir	Excellent
Service and support	Good	Excellent	Good	Foir	Excellent	Good	Foir	Good	Good	Excellent
Price	Excellent	Excellent	Poor	Good	Foir	Good	Good	Excellent	Excellent	Poor
Overall value	Excellent	Excellent	Good	Good	Good	Foir	Good	Good	Good	Good
	BEST BUY	BEST BUY								
Reader service no.	748	749	750	751	752	753	754	755	756	757

How we rate super-VGA boards
We rate these boards bosed an information in the Features Evaluation and the PC World Test Repart, cambined with aur apinions of quolity, reliobility, and user benefit.

Software support refers ta the number and type af drivers that came with a board. Ta rate an Excellent, a board must pravide drivers for *Windaws, 1-2-3, WardPerfect, Ventura (GEM)*, and *AutaCAD*, with 256 colars in *AutaCad* and *Windaws*.

Flicker-free support is based an the averall screen benefits a board offers. To garner an Excellent rating, a board must provide at least 70-Hz screen refresh. As the quality af the screen image and the speed af the refresh drap, sa does the roting. Baords that have neither 70-Hz ar better screen refresh nor noninterlaced scanning rate a Paar.

Ease of installation applies ta both hardware and saftware setup. Totally switchless installatian merits an Excellent. Ta win a Gaad, o baard must require thot yau change settings anly in unusual circumstances, such as when a netwark board is present. A Fair rating is awarded when hardware conflicts between the videa board and the PC are nat covered in the documentatian.

Performance is derived fram benchmark results. With business ond *Windaws* applicatians, these boards shaw little difference in speed, except in the *AutoCAD* and *PowerPaint* tests. An Excellent rating gaes ta thase boards thot perform well in both tests.

Service and support includes the length af warranty, the avoilability af tech suppart, ond ather suppart services. A baard that hos o BBS with pragram driver updotes, o worranty of faur years or more, and fax tech suppart earns on Excellent rating.

Price ratings are based an street prices, which were determined fram an extensive phone survey of dealers.

Overall value is a weighted summary af all the obove criteria, with emphasis on saftware support, flicker-free support, and ease af installatian.

the command line.

If you use *AutoCAD* and you're looking for a fast VGA board at a bargain price, the PowerGraph is an excellent choice.

Trident Impact III

PROS: Low cost, widest software support

CONS: Slow performance

The Trident Impact III costs only $12 more on the street than the rock-bottom Boca SuperVGA. Amazingly, for that low $172 price, you get the widest selection of drivers in the roundup.

Trident provides 132-column drivers for *Word* and *WordStar*, plus 256-color drivers in all super-VGA resolutions for both *Windows* and *AutoCAD*. You don't get a menu for swapping drivers, though, and hardware installation isn't switchless.

The board's speed could be better. In most of the key performance benchmarks, the Impact III hovered in the bottom third.

If you like the idea of 132-column word processing in *Word*, this board is your best choice. Otherwise, bargain hunters would do better to opt for the superior performance, switchless installation, and even lower price of the Boca SuperVGA.

Video Seven VRAM II

PROS: Top Windows performance, easy software installation

CONS: Expensive, no 256-color AutoCAD drivers

The Video Seven VRAM II zips through *Windows* like there's no tomorrow—it came in first in every *Excel* test and won two out of three *PowerPoint* tests. At $370 it also has the second-highest street price, which buys you a very generous seven-year warranty.

The board also offers the second-best selection of drivers and a menu-driven utility to load them. However, the lack of 256-color *AutoCAD* drivers and the lackluster *AutoCAD* performance should discourage users of that application.

Unique among the boards reviewed, the VRAM II requires a special daughtercard when you upgrade from 512K to 1MB. The daughtercard lists for a whopping $200, and unlike with the Everex Viewpoint VRAM, you can't swap in ordinary RAM to save money.

This is a fast, top-quality board for *Windows*, with the longest warranty we've seen, but the price may deter you.

A Bevy of Smart Buys

Super-VGA technology keeps getting better. The boards in this roundup are faster, easier to install, and more reliable than last year's models, and most add flicker-free operation for easier viewing. All but one earn a Good overall rating or better.

The bar has been raised, and ATI's VGA Wonder XL and Boca's SuperVGA come away with Best Buys because they soar just a little bit higher. They're the only boards to offer the ease of truly trouble-free switchless installation. ATI piles on the features—including a mouse, menu-driven driver installation, and flicker-free performance for even the best monitors—while Boca slaps on an unbelievably low price and a reassuring five-year warranty.

One final note before you snap up one of these winners: Make the salesperson at your local PC retailer earn his or her pay. Find the board you want, and hook it up to your monitor or to the one you plan to buy. Run it with every application you plan to use, in every super-VGA mode. With the right combination, you'll see lovely, flicker-free images that will stand you in good stead for years to come.

TJ Byers is a contributing editor and Eric Knorr the editor for PC World.

For more information about all products in this article, circle reader service no. 908.

WHERE TO BUY

ATI VGA Wonder XL
ATI Technologies
3761 Victoria Park Ave.
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M1W 3S2 Canada
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416/756-0720 (fax)
Reader service no. 748

Boca SuperVGA
Boca Research, Inc.
6413 Congress Ave.
Boca Raton, FL 33487
407/997-6227,
407/997-0918 (fax)
Reader service no. 749

Everex Viewpoint VRAM
Everex Systems
48431 Milmont Dr.
Fremont, CA 94538
800/992-2839,
415/683-4524 (fax)
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Genoa SuperVGA 6400A
Genoa Systems
75 E. Trimble Rd.
San Jose, CA 95131
800/423-6211,
408/434-0997 (fax)
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Orchid ProDesigner II
Orchid Technology
45365 North Port Loop W
Fremont, CA 94538
800/767-2443,
415/490-9312 (fax)
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Paradise VGA 1024
Western Digital Corp.
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Mountain View, CA 94043
415/960-3353
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SigmaVGA Legend
Sigma Designs
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STB PowerGraph Ergo-VGA
STB Systems
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Richardson, TX 75081
800/234-4334,
214/234-1306 (fax)
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Trident Impact III
Trident Microsystems
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800/348-8808,
408/738-3194 California,
408/738-0905 (fax)
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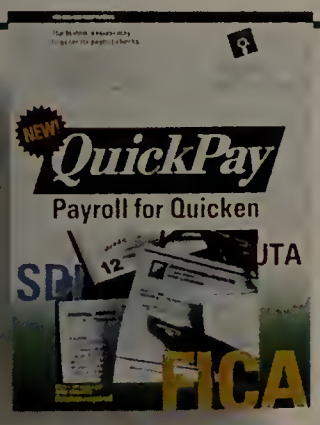

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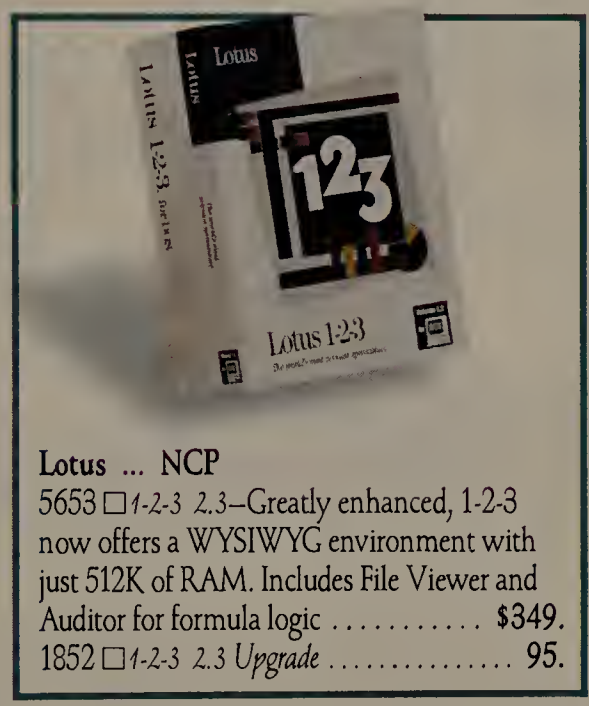

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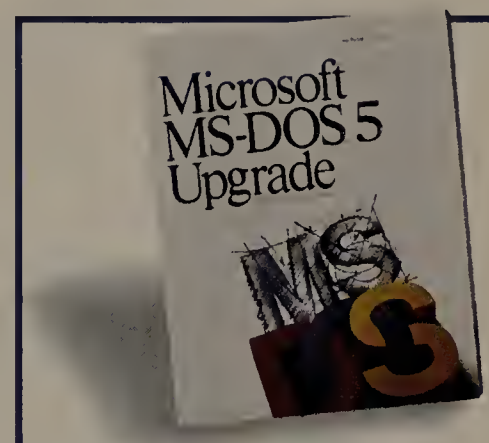
9618 ⊙ Legacy 1.1 . . . . . 289.



Microsoft ... NCP

1620 ☐ *DOS 5.0 Upgrade*–Improved graphical shell, on-line help, task swapping, full screen editor, and more are all awaiting you with DOS 5.0. Upgrade your current DOS with ease to DOS 5.0 for only . . . . . **$65.**

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9879 ⊡ ReadRight 2.01 . . . . . 309.
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Okna ... NCP

9696 ⊙ Desktop Set 3.0 for Windows . . . . . 85.

Passport Design ... NCP

1329 ⊙ Encore 2.0 . . . . . 379.

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7967 BlueMAX 5.1 for PS/2 *(3½" only)*. . . . . 85.

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3221 ☐ Expanded Memory Mgr. 386 5.1 . . . . . 65.
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4586 ☐ DESQView 386 2.3 . . . . . 145.

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7483 ⊙ Grammatik for Windows 2.0 . . . . . 59.

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3720 Flashcard 2.1 *(AppleTalk network card)* . 155.
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7604 ◉PLUS for Windows 2.0 . . . . . 289.
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1409 ◉Stacker 1.1 . . . . . 89.
Symantec ... NCP
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3146 ◉The Norton Utilities 6.0 . . . . . 119.
3425 ☐Q&A 4.0 . . . . . 239.
7999 ◉Norton Anti-Virus 1.0 . . . . . 89.
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6564 ☐Software Bridge 5.0 . . . . . 79.
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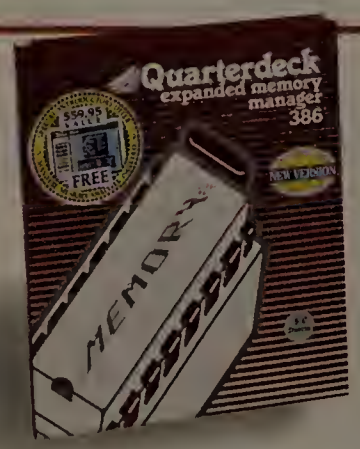
1270 ☐TimeSheet Pro 2.0 . . . . . 145.
Timeworks ... NCP
6253 ◉Publish-It! 2.0 . . . . . 139.



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3221 ☐ *Expanded Memory Manager 386 5.1*– Finds up to 200K of "hidden" memory in your PC and manages Expanded or Extended memory. A must-have for memory-hungry software, networks or Windows 3.0 . . . $65.

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7781 ◉LetterPerfect 1.0 . . . . . 129.
3804 ☐WordPerfect 5.1 . . . . . 265.
6685 ◉DrawPerfect 1.1 . . . . . 279.
WordStar International ... NCP
1482 ◉Correct Grammar 1.0 for Windows . . . . 65.
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XTREE ... NCP
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1626 ◉Publisher's Paintbrush for Windows . . 299.

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8068 ◉Where in the World is Carmen Sandiego Deluxe Edition . . . . . 52.
5851 ◉SimCity. . . . . 33.
8886 ◉SimEarth. . . . . 45.

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☐Word Torture 3.0 . . . . . ea. 29.
Microsoft ... NCP
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2858 ☐Flight Simulator 4.0. . . . . 39.
8270 ◉Aircraft and Scenery Designer 1.0 . . . . 29.
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8136 Running Microsoft Excel . . . . . 22.
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◉VocabuLearn/ce Levels I & II (French, Italian, German, Spanish, Russian, Hebrew and Japanese) . . . . . *each* 35.
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7972 ☐King's Quest V *(VGA)* . . . . . 45.
SirTech. ... CP
8235 ☐Bane of the Cosmic Forge . . . . . 39.
Software Toolworks ... NCP
4659 ◉Chessmaster 2100 *(CP)* . . . . . 35.
7372 ☐World Atlas. . . . . 42.

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Stone & Associates ... NCP
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Toyogo ... NCP
7674 ◉Nemesis Go Master 4.7 . . . . . 41.
7676 ◉Nemesis Go Master Deluxe 4.7 . . . . . 88.
True BASIC, Inc. ... NCP
◉Kemeny/Kurtz Math Series . . . . . *each* 45.

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7105 Smart UPS 600 . . . . . 469.
6811 Back-UPS 360 . . . . . 219.
7106 Back-UPS 520. . . . . 329.
AST Research ... 5 years
1299 SixPakPlus 384k C/S/P. . . . . 179.
8041 SixPak 286 0k . . . . . 99.
ATI Technologies ... 2 years
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9985 VGA Integra *(1024 x 768, 64 colors)* . . . . 129.
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9619 Ultra/8514 Graphics Card *(512K) (req. VGA)* 419.
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9620 9600etc/e Modem . . . . . 379.
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7001 BOCARAM/AT PLUS *(0-8 Meg)* . . . . . 119.
7061 BOCARAM/XT 0K *(0-2 Meg, LIM 4.0)* . . . 99.
6998 I/O Board for AT . . . . . 59.
6999 I/O Board for Microchannel *(S/S/P)*. . . . . 109.
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8381 SuperVGA *(1 Meg, 1024 x 768)* . . . . . 145.
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7400 2 Position Laser Compatible Switch Box. 109.
Brown-Wagh ... 1 year
8578 Creative Labs Sound Blaster . . . . . 159.
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9038 BJ-330 Printer *(136 column)*. . . . . 649.
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9828 BubbleJet Ink Cartridge *(BJ-300 & BJ-330)* 26.
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We are an authorized Epson Service Center.

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1930	LQ-850 *(80 col., 264 cps, 24 pin)*	call
1917	LQ-1050 *(136 col., 264 cps, 24 pin)*	call
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9032	20 MHz 386 Motherboard for XT	995.
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6420	2400EX MNP Modem	229.
7880	9600EX Modem	549.
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5336	Above Board Plus 8 2 Meg	449.
5342	Above Board Plus 8 I/O 2 Meg	479.

7782	SatisFAXtion *(fax board)*	$399.
8778	SatisFAXtion for Microchannel	449.
8901	Matched Memory 2 Meg *(PS/2)*	139.
8903	Matched Memory 4 Meg *(PS/2)*	299.
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4750	80387SX *(16 MHz 80386SX CPU's)*	309.
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2582	Master Piece Plus	99.
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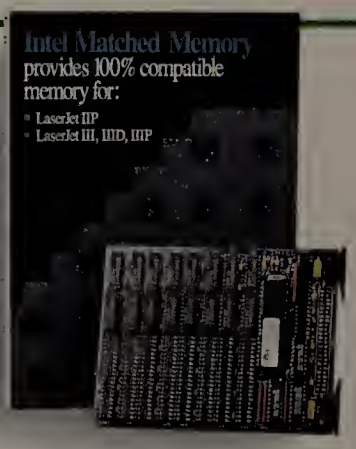
1196	T224 2400 Modem *(for Toshiba Laptops)*	129.
1187	T324FM 96/24 Fax Modem *(Toshiba Lptps.)*	299.



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2897	Mouse with Paintbrush	105.
2898	Mouse with Windows 3.0	149.

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7934	PM9600SA Modem	489.
	Targus ... lifetime	
4900	Lappac 2 Carrying Case *(Horizontal)*	55.
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9893	T2000SX Notebook *(40 Meg)*	2999.
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	Conner Peripherals ... 1 year	
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1337	CP3204 200 Meg IDE HD *(16 ms)*	899.
	IOMEGA ... 1 year	
5116	Bernoulli II 44 Meg Internal	829.
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2500	PC2B Controller	209.
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5[illegible]10	DC2000 Pre-formatted Cartridges	ea. 35.
6[illegible]3	DC2120 Tape Cartridge *(5 pack)*	149.
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6[illegible]02	1.44 Meg External *(for PC/XT/AT)*	239.
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8[illegible]04	Hardcard II XL 50 Meg *(9 ms)*	399.
8[illegible]07	Hardcard II XL 105 Meg *(9 ms)*	599.
	Seagate ... 1 year	
4554	40 Meg Internal HD ST251-1 (28 ms)	$269.
1321	ST157A 40 Mb IDE Hard Drive	239.
1320	ST1144A 130 Mb IDE Hard Drive	499.
	TEAC ... 1 year	
4670	1.44 Meg Drive for PC/XT *(3½")*	75.
4326	1.44 Meg Drive for AT *(3½")* with Bastech software	99.
4951	720k Drive for PC/XT *(3½")*	69.
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2789	5¼" MD2-D 360k Disks *(Qty. 10)*	10.
2790	5¼" MD2-D 1.2 Mb Diskettes *(Qty. 10)*	15.
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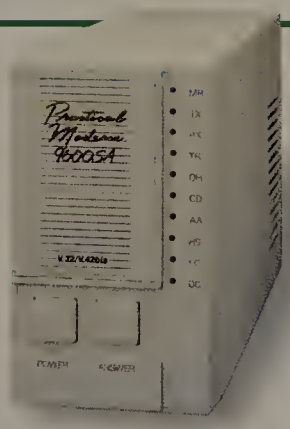
2793	3½" DS/HD 1.44Mb Diskettes *(Qty. 10)*	21.

Canon ... 1 year
7094 *BJ-10e BubbleJet Printer*–Light weight, excellent print quality and a great price make this 4.6 lb. printer a winner. Choice of black or white. Optional sheet feeder ..... $329.



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3297	3½" DS/DD 720k Diskettes *(Qty. 10)*	11.
3298	3½" DS/HD 1.44Mb Diskettes *(Qty. 10)*	18.
6148	3½" DS/DD *(3 Pack)*	29.
6375	3½" DS/HD *(3 Pack)*	49.
8185	QD 2040 Tape Cartridge	19.
	3M ... lifetime	
3943	DC 2000 Tape Cartridge	19.
6065	DC 2080 Tape Cartridge	25.
3944	DC 600 Tape Cartridge	29.
5679	DC 6150 Tape Cartridge	29.

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6556	256k DRAM *(100 ns, set of 9)*	call
5510	1 Meg x 9 SIMMs *(80 nanosecond)*	call
5746	1 Meg Chips *(80 ns, set of 9)*	call
7813	256k x 4 Chips	call

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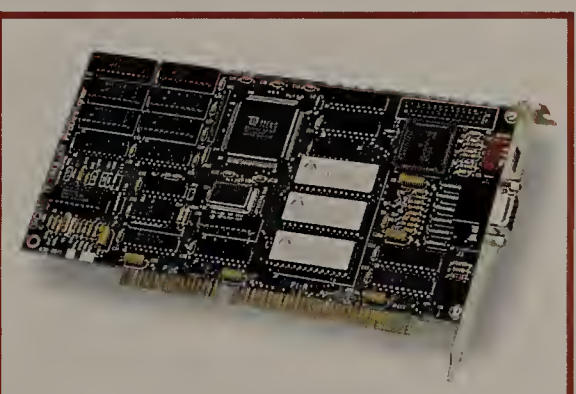

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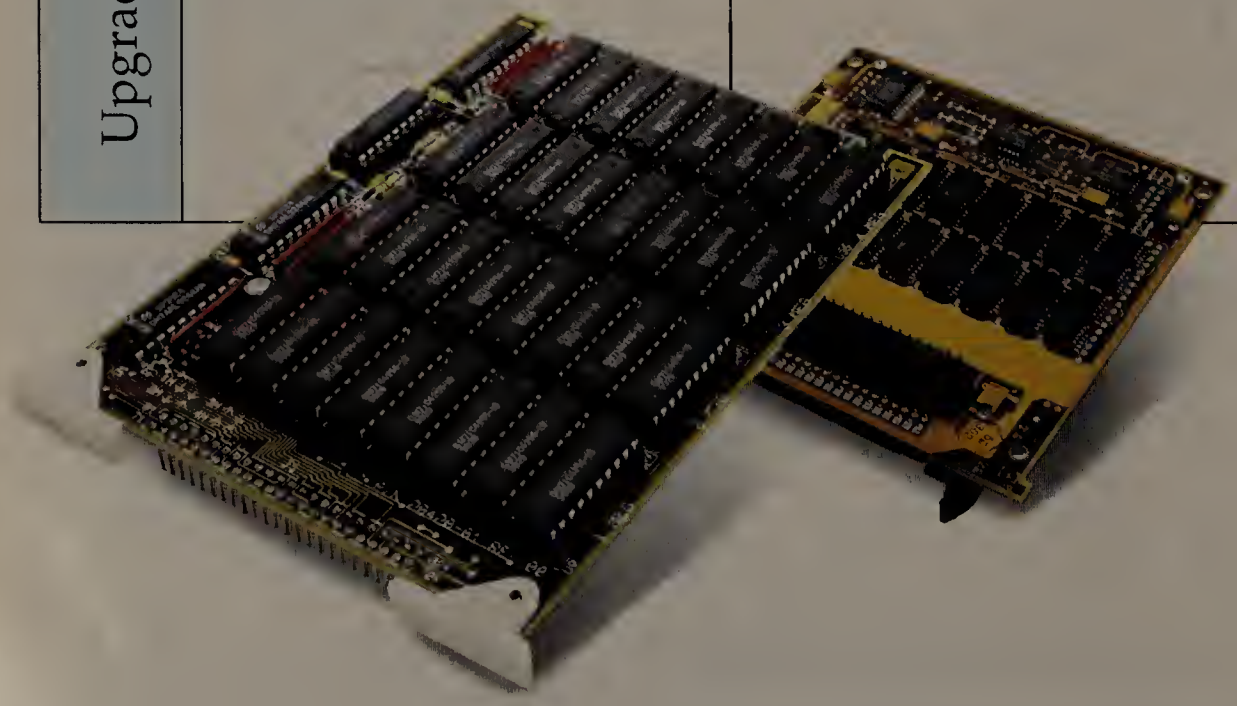
Upgradeability	**Fully Upgradeable to 4 MB**	**Not Upgradeable**



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All-in-One Business Software

If you're an occasional user or a laptop jockey, one of these low-cost integrated packages can handle all your word processing, spreadsheet, data management, and communications needs.

George Campbell

ROB SAUNDERS

What's the first thing you do after acquiring a computer? You buy a collection of applications to go with it, of course. Combined, they can be almost as expensive as the computer itself. And learning how to use one program will in no way help you learn the others: They all behave differently.

And what if that new computer is a laptop with a small hard disk—or no hard disk at all? If you try taking all those programs on the road, you may find yourself shuffling floppies like a talentless magician trying a half-remembered card trick.

If you seem to need more software than you can afford, store, or learn, you've got another option. A single, inexpensive, integrated package can provide word processing, data management, a spreadsheet, modem communications, and desktop utilities, all for less than $200. And integrated programs are truly cheap dates, working just fine on floppy-based, XT-class machines with a minimum of disk space. If you don't need the heavy power of stand-alone programs and you're looking for an easy way to coordinate all your computing jobs, one of these packages may be the answer.

Framework XE's multiple layers of menus can easily produce a confusing collection of boxes.

At their best, the various modules in an integrated package work together much better than separate programs do, even *Windows* applications. The better integrated programs use the same menus as you go from one module to another, making them easy both to learn and to use. They also let you exchange data easily—five of the six programs reviewed here, for instance, let you merge data directly from your data base to your word processor. Such magic is still a dream in *Windows*.

What's In, What's Out

You'll find all the essentials in these packages, but not the complicated extras. Consider the module most people use more than any other, the word processor. You can check spelling and do some basic editing, but don't expect to create the fancy reports and newsletters you can in *WordPerfect*. The other modules tend to be similar: You can crunch numbers, maintain data base records, or get on line, but don't look for back-solving spreadsheet analysis or complex data base file linking.

If these limitations seem too confining but you still want a tightly integrated package, you have another option—a more powerful, more expensive integrated program such as *Lotus Symphony* or *Framework*. But if you need the additional power, you'll probably be happier with one of the stand-alone programs that are designed to do one thing and generally do it very well.

We looked at six inexpensive integrated packages and found one Best Buy—*Microsoft Works*. It's outstandingly easy to use, offers excellent integration between modules, and its all-important word processor stands clearly above the rest.

Eight-in-One 2.03

PROS: Low cost, good word processor, excellent desktop utilities

CONS: Little data exchange between modules, limited spreadsheet and data base tools, no macros

Spinnaker's *Eight-in-One* isn't as powerful as most of its rivals, but its amazingly low $59.95 price makes it a good buy if you need a capable little word processor backed up with a well-designed calendar, calculator, and other desktop tools.

Eight-in-One's desktop accessories could succeed as a stand-alone utility collection. The outliner lets you attach extensive notes to each heading, and the alarm clock includes a timer and stopwatch.

Overall, the program is easy to learn and use. The function you need is usually where you'd expect to find it, and the menus remain consistent from module to module. On-screen, mouse-clickable buttons and easy-to-remember **<Alt>-***key* shortcuts make common options handy. But it's the only program in the roundup that won't let you automate common tasks with macros.

Although they use similar menus, *Eight-in-One*'s modules are hardly aware of each others' existence. You can't even send data from the spreadsheet or data base to the word processor—without going through an intermediary file.

Eight-in-One has a competent word processor. You can preview pages, and you can insert PCX-format commercial clip art. But some of the typing conventions are odd; the keystrokes you use to move the cursor, for instance, are neither conventional nor sensible.

The other modules are less powerful. The spreadsheet lacks named ranges, so you can't name a section of a worksheet for easy reference elsewhere, and the simple, nonrelational data base won't even let you view records together in a table so you can browse through and find the ones you need.

Eight-in-One is a so-so value if you crunch numbers or manage data. But its exceptional desktop tools, capable word processor, and low price make it a superb value for light word work.

Enable BP 1.0

PROS: 3-D spreadsheet, pop-up lists aid data entry

CONS: Inconsistent interface, no mouse support, no thesaurus

If you're looking for a powerful spreadsheet, the $199 *Enable BP* is a bargain—provided you don't mind an old-

Buying Smart: Making an Integrated Choice

If you opt for one inexpensive program to cover all your tasks, you want it to be easy to learn, well integrated, and relatively powerful, at least in the modules you're likely to use most (generally the word processor). You can't expect an integrated module to have the features of a good stand-alone program, but you should demand the features that will help you get your job done.

EASE OF USE

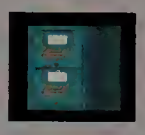
If you can't do your job without digging into a pile of manuals, you've got yourself a productivity problem. Look for logically designed pulldown menus that can help you find what you're looking for. You'll also want keyboard shortcuts and easy-to-record macros to help speed up your work. If you use a mouse, you'll want that supported as well.

INTEGRATION

For all its parts, an integrated program should work as a whole, letting you move—and move your data—easily between modules. Look for a consistent menu structure and the ability to view multiple modules on screen and cut and paste between them. Macros should work across modules, and the word processor should print charts from the spreadsheet and merge information directly from your data base. You should be able to print in the background so you can go about one job while putting another on paper. Finally, the program should integrate with the outside world, reading and writing files from popular, stand-alone programs.

WORD PROCESSOR

Most users process words more than they do numbers or data, so this module is the most important. All the programs reviewed have a spelling checker, but look also for a thesaurus and the ability to select fonts from a menu. You'll also want to see formatting choices on screen as you edit, and preview your page graphically before printing it.



DATA BASE

Managing data is a complex task, and these packages don't pretend to offer the power of a *Q&A*, let alone a *Paradox*. Still, a good integrated package should give you the tools to create a simple mailing list or contact manager. All the programs offer capable form and report designers, but you'll also want to view multiple records in an on-screen table or one record on a form and to query by form. For instance, you should be able to type 'CA' in the form's state field to get information on everyone who lives in California.

Other tools can come in handy as your data needs grow. If a program offers relational lookups, you'll be able to reference data from one data file in another, for instance, to check a company address that's saved separately from a contact's name.

SPREADSHEET

You'll use the spreadsheet module for budgets, expense accounting, and financial planning. If you can assign names to data ranges, your formulas will be easier to read and write; TOTAL SALES +(TOTAL SALES*TAX) certainly makes a lot more sense than @SUM(B8..B18)+(@SUM(B8..B18)*E64).

Graphs from your spreadsheet data can help you see—and express—the trends in your numbers. Look for several chart formats and, if you need to impress others, access to multiple fonts from inside your charts.

COMMUNICATIONS

If you have a modem, you'll want to let it do its job without making a big fuss. Most important: Look for a dialing directory that lets you place a call by picking a service from a list. You'll also want a script language (or at least a "record" feature) that lets you automate the log-on procedure for each service. An on-line text editor, something all these programs have, will help you move incoming data to other modules while connected. All these programs support the ubiquitous XMODEM file-transfer protocol, so you'll have no trouble sending and receiving files. Only a few of these programs, however, support faster protocols like YMODEM and ZMODEM.

DESKTOP ACCESSORIES

These handy tools let you work all day without leaving your integrated package. Look for a calendar and to-do list for scheduling, an alarm clock to remind you of appointments, and a pop-up calculator for simple math. Other useful tools include a file manager that lets you avoid the DOS prompt and an outliner to help you organize your thoughts before you put them down in your word processor.

FEATURES EVALUATION

Microsoft Works Brings Great Modules Together

Our Best Buy, Microsoft Works, offers easy data exchange and a first-rate word processor.

● Yes
○ Na
◒ Deficient
▲ Limited only by available RAM

	Eight-in-One 2.03	Enable BP 1.0	Framework XE 1.0	Lotus Works 1.0	Microsoft Works 2.0	PFS: First Choice 3.1
Standard features						
Price	$59.95	$199	$149	$149	$149	$149
RAM required	512K	512K	640K	512K	512K	512K
Mouse support	●	○	●	●	●	●
LAN support	○	●	○	●	●	●
Integration						
Maximum files open	1	8	▲	29	8	1
Multiple modules on screen	○	●	●	◒[2]	●	○
Cut/poste between modules	◒[3]	●	●	●	●	●
Mocros work ocross modules	○[4]	●	●	●	●	●
Mail merge with dota bose	◒[5]	●	●	●	●	●
Include chorts in documents	●	●	●	○	●	●
Reod/write DBF files	○	●	●	●	●	○
Reod/write WK1 files	◒[6]	●	◒[6]	●	●	◒[7]
Read/write WordPerfect/ Microsoft Word files	○	○	●	○	●	●
Word processor						
Thesourus	●	○	○	●	●	●
Menu selection of fonts	●	○	○	○	●	○
Print preview	●	○	○	○	●	○
Data base						
Table view	○	●	●	●	●	●
Query from form	●	○	○	○	●	●
Relotionol lookups	○	●	●	●	●	○
Spreadsheet						
Nomed ronges	○	●	○	●	●	○
Chort types	6	10	8	5	8	10
Fonts in chorts	3	8	1	1	7	4
Communications						
Dioling directory	●	●	◒[8]	○	●	●
Script longuoge	○	●	●	●	●	◒[9]
Error correction protocols	1	3	5	3	1	1
Terminal emulotions	3	3	10	5	2	2
Desktop accessories						
Colendor/to-do list	●	○	●	○	●	○
Alarm clock/reminders/colculotor	●	○	○	○	●	○
File monoger	●	●	●	○	●	●
Outliner	●	●	●	○	●	●
					BEST BUY	

[1] 1990 World Class Award winner.
[2] Only twa modules at a time.
[3] Nat directly fram data base ar spreadsheet.
[4] Na macros.
[5] Must convert data base first.
[6] Impart/expart rather than direct read/write.
[7] Can impart, but daesn't recognize same camman functions.
[8] Must exit program to add new entry.
[9] Recards log-ons anly, na editing.

fashioned interface. Even a simple task like marking a range of cells requires multiple key presses rather than a simple click and drag with the mouse. Mastering that spreadsheet will be of little help if you try using *Enable BP*'s other modules—each one has a different interface.

Learning *Enable* is a challenge. Many tasks—viewing a list of files, for instance—require more keystrokes than they should. To do any but the simplest data base or communications tasks, you need to put on your nerd cap and start programming. And as if to flaunt its complexity, the program comes with nine manuals—a laptop user's nightmare.

Fortunately, the capable spreadsheet handles a full array of powerful number-crunching chores. You can even reference a cell or range from another worksheet to, for instance, read sales commission figures from one file into a sales report in another. And when you import a *1-2-3* or *SuperCalc* file, the macros still work. If you want to produce charts, your options include 3-D charting and exploded pie charts.

For only $199, *Enable BP* offers plenty of spreadsheet power, but its clunky interface will put off many users.

Framework XE 1.0

PROS: Tightly integrated modules, five communications protocols

CONS: Complex interface, undocumented command language

With its powerful programming language, *Framework XE* is well suited for work groups with at least one technically proficient person. And thanks to the everything-but-the-kitchen-sink communications module, members of those work groups will be able to take their jobs on the road. But going it alone, you'll be hard-pressed to learn *XE*'s arcane interface.

Concepts like *frame trays, in and out keys,* and *containing frames* make this program a tough study. For example, to customize the program by writing a macro that pauses for input, you must master a full programming language—and you have to buy *XE*'s big brother, *Framework,* for the documentation. When creating a data base, you have to tell *Framework* how many fields you'll need before you name them,

Is the High End a Dead End?

Susan Lusty

At first glance, a high-end integrated program like *Symphony* or *Framework* may seem like a wise choice. Even though it costs about four or five times as much as the programs in this roundup, it's much cheaper than a collection of separate applications. It's also more powerful than a low-cost integrated package, although still no match for a good stand-alone program.

Yet, high-end integrated packages have some drawbacks. One key reason to buy any integrated package is to get productive as quickly and easily as possible, but high-end integrated packages aren't nearly as easy to use as their less expensive siblings. It's worth noting that *Enable BP* and *Framework XE,* the two programs in this roundup to inherit their interface from high-end software, are the most difficult we reviewed.

One reason for the recent growth of the low-end packages is the boom in laptop sales—these small-footprint programs are perfect for users who don't want to be caught on the road without a full tool kit. But the high-end packages take too much disk space for optimal laptop use—especially if your laptop still lacks a hard drive.

In addition, you'll likely wait a long time between upgrades with the high-end packages. Due to the difficulty of upgrading multiple high-end modules and a lack of sales, most high-end packages have fallen behind the times.

Meanwhile, vendors are actively pursuing (and upgrading) the low end. As noted, Enable Software and Ashton-Tate have both shipped scaled-back versions of their *Enable* and *Framework* packages, while Lotus Development, the maker of *Symphony,* acquired the smaller-scaled *Alpha Works,* renaming it *Lotus Works*.

The growing number of *Windows* applications, which offer a unified interface and easy data exchange between programs, are hurting the sales of high-end packages. Even DOS users have alternatives: "families" of programs—such as *WordPerfect, DrawPerfect,* and *DataPerfect*—that use a common interface and can be linked together with common macros. What's more, stand-alone applications are becoming more inclusive—*WordPerfect,* for instance, has crude spreadsheet abilities, and word processing add-ins are available for *1-2-3*.

With the steady flow of new users, and especially new laptop users, low-end integrated packages have a bright future. But the high end appears to be going...going...gone.

and the option to define field types (text, numbers, dates, and so on) is hidden away on the Numbers menu.

If you can master the front end, you'll find that all of *Framework XE*'s pieces fit together nicely. You can cut and paste easily between its multiple on-screen applications, and size and move its windows for a good look at what you're doing.

If you just look at features, *Framework XE*'s communications module can't be beat; you even get modem-only support for Novell's Message Handling System (MHS) E-mail standard, so you can phone into your LAN for messages. But if you try the module, you'll find a clumsy design makes it extremely difficult to set up. For instance, to add an entry to the dialing directory, you have to exit *Framework* and use the install program.

Like its big brother, *Framework XE* is well integrated and highly configurable. If your company is already using *Framework,* this low-end version is a good choice for staff with lesser demands. Otherwise, the program's strengths don't offset the learning curve.

Lotus Works 1.0

PROS: Powerful data base and spreadsheet, selectable menu styles

CONS: One font per document, difficult data base searches

Known as *Alpha Works* before Lotus Development acquired it, *Lotus Works* provides strong spreadsheet and data base modules. *Lotus Works* is a fairly good integrated package, but *Microsoft Works* covers the same territory better and is easier to use.

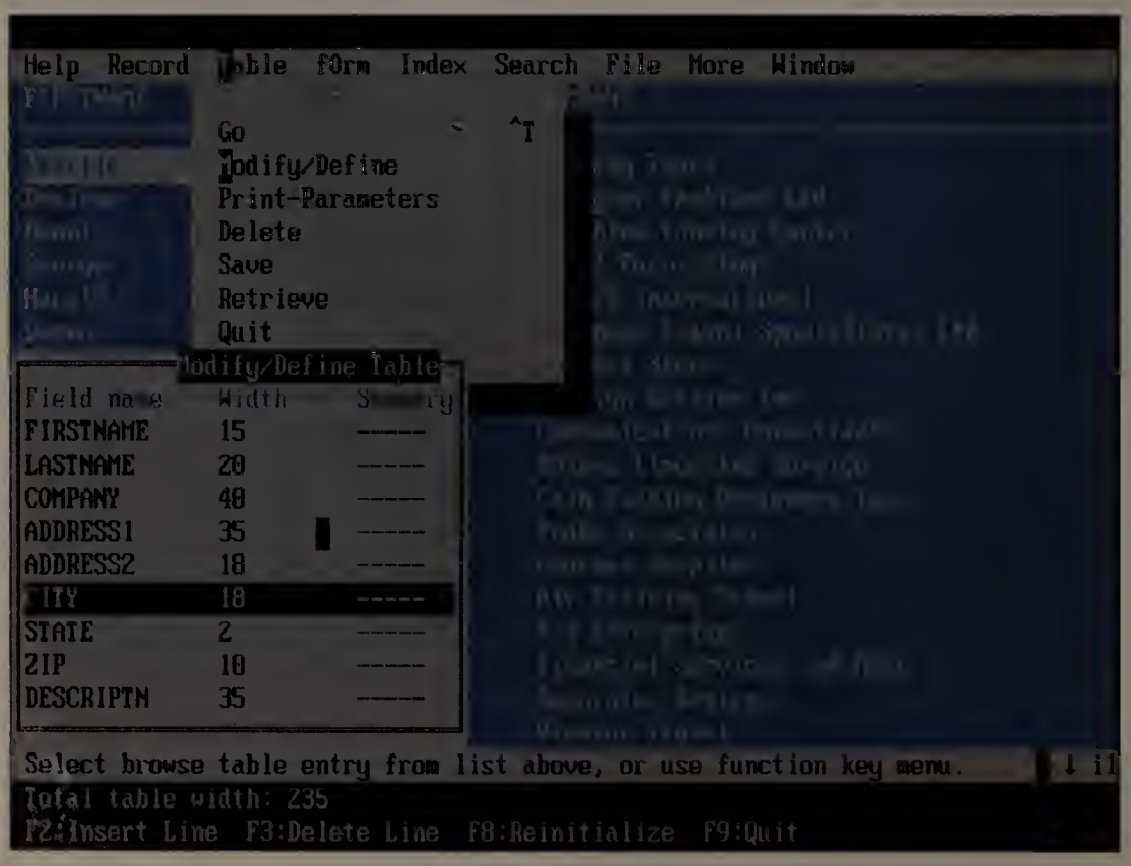
You can get going quickly in *Lotus Works* without using the manual, and if you have problems, the program comes with six months of toll-free technical support, the most generous in the roundup. Another plus: You can switch easily between pulldown and *1-2-3*-style menus. If you're sharing data with coworkers' nonintegrated programs, *Alpha Works* is a great choice. Its native spreadsheet and data base file formats are the WKI and DBF standards.

But the program's quirks may slow you down. For instance, you can't use your mouse to mark a block without pressing a key first, and even in the word processor, the slash key brings up the menu bar—you have to press it *twice* to type a slash. The menus differ more than is necessary from module to module.

Not surprisingly, *Lotus Works* has a very good spreadsheet, complete with named ranges and a full set of functions. Graphing options, on the other hand, are the most limited in the roundup.

The other modules vary in quality, but each lacks an important feature. The communications module supports the speedy YMODEM protocol, but there's no dialing directory. And while the data base has some powerful file-linking capabilities, searching for data is complicated; to find John Jones, you'd have to type **LastName = "Jones" + FirstName = "John"**. The word processor limits you to one font per document.

Lotus Works has a fine spreadsheet and some other good tools. But a disappointing interface and word processor make it only a fair value.



In the Lotus Works data base, you can select fields to display in a table, alter field width, or print the table as a report.

Microsoft Works 2.0

BEST BUY

PROS: Easy interface, on-screen windowing, font support, easy data searches

CONS: No dialing directory, background printing, or outliner

Microsoft Works backs up a superb interface with powerful tools. The program bears a family resemblance to *Windows,* so you'll have no trouble switching either way. Fully mousable, *Microsoft Works* also works just fine rodent-free, with easy-to-remember **<Ctrl>-***key* shortcuts for most operations. Some of its rivals may offer online tutorials, but only *Microsoft Works* lets you take a lesson from the Help menu. Unless you demand top-notch communications, it's a clear Best Buy.

Integration between modules is excellent, with a consistent menu bar serving all modules. To select data for cutting and pasting between modules, you simply drag the mouse or use shifted

Microsoft Works—and You Win

A minimalist masterpiece, Microsoft Works delivers just the features you need in all the key applications.

Low-cost integrated software is not only a bargain but also a time-saver. By including several applications under one interface umbrella, it helps you learn faster and keep all your tasks tightly linked.

Microsoft Works 2.0 comes out on top as a Best Buy, with its easy-to-use Windows-like interface, full integration, and excellent word processing module. **Eight-in-One,** with solid word processing, a full set of desk accessories, and a low price, comes in a distant second.

	Eight-in-One 2.03	Enable BP 1.0	Framework XE 1.0	Lotus Works 1.0	Microsoft Works 2.0	PFS: First Choice 3.1
Ease of use	Good	Poor	Poor	Fair	**Excellent**	Good
Integration	Foir	Foir	Excellent	Fair	**Good**	Good
Word processor	Good	Foir	Fair	Fair	**Excellent**	Fair
Data base	Fair	Foir	Fair	Good	**Good**	Good
Spreadsheet	Foir	Excellent	Fair	Good	**Excellent**	Poor
Communications	Foir	Good	Good	Good	**Fair**	Foir
Desktop accessories	Excellent	Poor	Fair	Poor	**Good**	Poor
Overall value	Good	Fair	Foir	Foir	**Excellent**	Fair
					BEST BUY	
Reader service no.	610	611	612	613	614	615

How we rate integrated packages
We base aur scares an infarmatian in the Features Evaluatian table, cambined with an assessment of the quality af each madule.

Ease of use considers haw easy it is bath to learn the pragram and to use it ance you're experienced. An Excellent rating demands mause support, logical menus, and flexibility in using the keybaard or mause.

Integration assesses how well the various modules wark tagether and haw easy it is ta share data between madules and with ather pragrams. To receive an Excellent rating, a package's menus and cammands must change very little from madule to module, and macros shauld wark across all madules. The program must display multiple madules on screen, da mail merge straight fram the data base madule ta the word pracessor, and directly read and write several papular file farmats.

Word processor evaluates the taals pravided for creating, editing, farmatting, and printing text. To earn an Excellent rating, a package must affer a well-designed editing enviranment with a spelling checker and thesaurus, let yau control your printer's fonts easily, and pravide a graphic preview af your page before yau print it.

Data base considers the pragram's handling af structured and sortable data, such as a mailing list. An Excellent rating means a pragram affers easy form and repart design taals, a table view af your data, relatianal laokups, and querying fram a farm.

Spreadsheet rates the program's ability to calculate, analyze, and graph numeric data. Ta receive an Excellent rating, a program must let yau name ranges of cells. It must also let yau create at least eight chart farmats, and affer a minimum af four fants for titles and labels.

Communications ratings cansider how well yau can communicate by modem or network. An Excellent rating requires a dialing directory that lets you add new entries withaut exiting the pragram, at least ane file transfer protocol besides XMODEM, the ability to edit text while an line, a script language, and at least five terminal emulations.

Desktop accessories evaluates additianal tools that can increase productivity. An Excellent rating demands a pap-up calculatar, a calendar, a to-do list, an alarm clack with reminders, an autliner, and a DOS file manager.

Overall value is averaged fram the abave ratings, with extra weight given ta ease of use and, to a lesser extent, integration and word processing. The price af the pragram is alsa taken inta consideration.

cursor keys. Sharing data with other programs is not so easy; the program can't handle or directly import documents in any popular word processing format—even *Microsoft Word.*

The word processor is by far the best of this group's, with full font control and easy block operations. The data base may not have the file-linking power of *Lotus Works,* and the spreadsheet lacks *Enable*'s 3-D references and ten chart types, but both modules offer everything else you'll need, and they're easy to use.

You won't be so happy with the communications module, however. There's no dialing directory, limited terminal support, and just one transfer protocol.

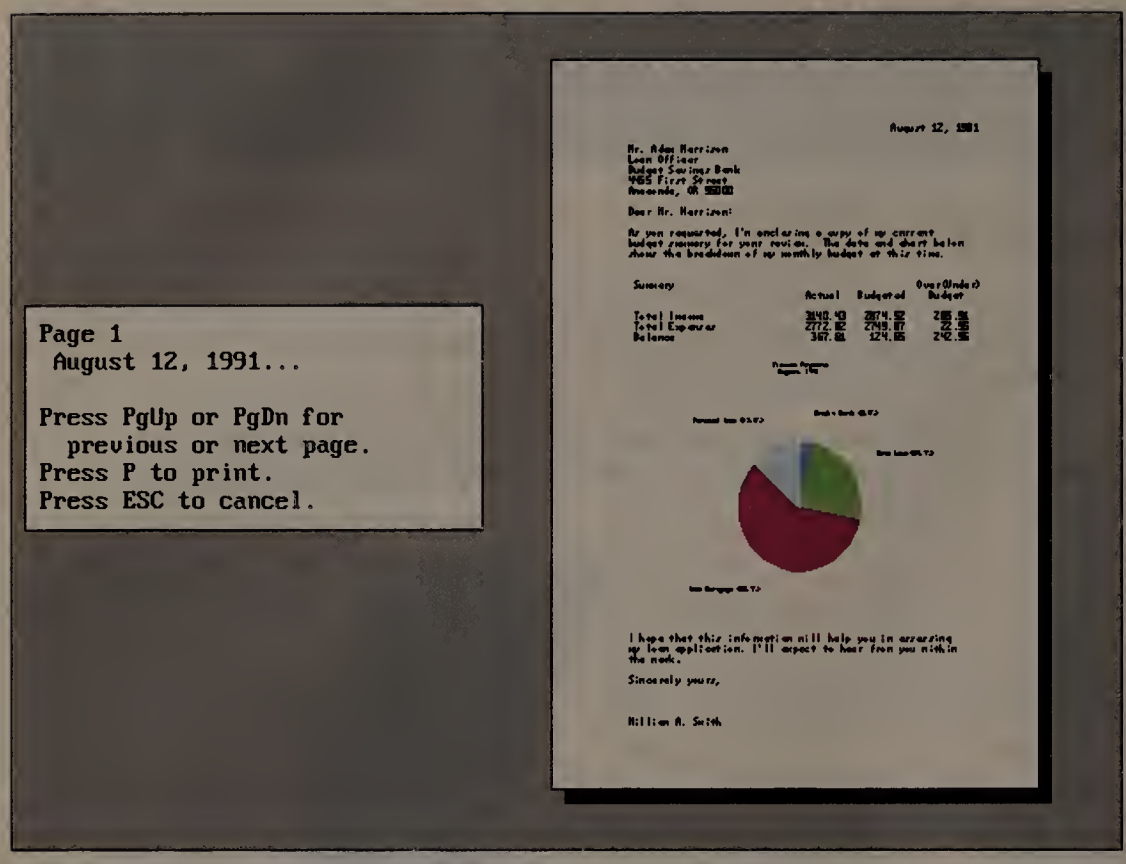
These flaws aside, *Microsoft Works* is an ideal Best Buy. It's perfect for novices, laptop users, and just about anyone who needs an integrated package.

PFS:First Choice 3.1

PROS: Most modules easy to use, strong integration, good data base

CONS: Poor spreadsheet, few desktop tools

With its easy interface and tight integration, *PFS:First Choice* is a quick start. But the program's unremarkable word processor and eccentric spreadsheet limit it to a fair value.



Microsoft Works' page preview makes it easy to see the final format of any document, replete with charts and pasted-in spreadsheet data.

The name *PFS* has long meant *easy to use,* and *First Choice* lives up to that reputation. Mouse support, well-designed pulldown menus, context-sensitive help and logical <Alt>-*key* shortcuts make it easy to get up to speed. The program is well integrated, with consistent menus and macros across modules, but you can't open multiple windows on the screen.

Applications are limited, even for novices. For instance, the word processor restricts you to just one font per document, and you can't even insert a blank line without a menu command.

First Choice's spreadsheet will drive you crazy. You can't put numbers or formulas in the left-hand column, you address cells with codes like C1R1—much clumsier than the conventional A1—and even entering a formula is confusing. While it can import *1-2-3* files, *First Choice* doesn't understand the ubiquitous @SUM function.

Beginning users might appreciate *First Choice*'s easy menus. But they will soon balk at its limited word processor, funky spreadsheet, and weak desktop tools.

Putting It All Together

Making a good integrated program is apparently a difficult job—most of the programs reviewed here are only fair. Fortunately, we did find one program we can recommend without hesitation: *Microsoft Works*' friendly face and first-class word processor make it an unbeatable Best Buy. ●

George Campbell is a contributing editor and Susan Lusty an assistant editor for PC World.

For more information about all products in this article, circle reader service no. 903.

WHERE TO BUY

Eight-in-One 2.03
Spinnaker Software Corp.
201 Broadway
Cambridge MA 02139
800/323-8088,
617/494-1219 (fax)
LIST PRICE: $59.95
REQUIREMENTS: 512K, DOS 2.1 or later version, two floppy drives
TECHNICAL SUPPORT: unlimited, toll number, M–Th 10–5, F 10–4
OTHER SUPPORT: none
Reader service no. 610

Enable BP 1.0
Enable Software Inc.
Northway Ten Executive Park
Ballston Lake, NY
12019-1519
800/888-0684
LIST PRICE: $199
REQUIREMENTS: 512K, DOS 2.1 or later version; hard disk recommended
TECHNICAL SUPPORT: toll number, M–F 9–7
OTHER SUPPORT: BBS, extended support with toll-free number at extra cost
Reader service no. 611

Framework XE 1.0
Ashton-Tate Corp.
20101 Hamilton Ave.
Torrance, CA
90509-2833
800/437-4329,
213/329-9989
LIST PRICE: $149
REQUIREMENTS: 640K, DOS 2.0 or later version, two floppy drives
TECHNICAL SUPPORT: unlimited, toll number, M–F 6–4:30
OTHER SUPPORT: BBS, CompuServe and GEnie forums, extended support at extra cost
Reader service no. 612

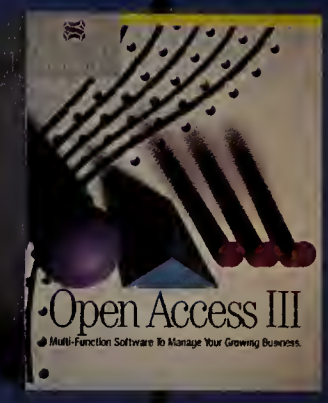
Lotus Works 1.0
Lotus Development Corp.
55 Cambridge Pkwy.
Cambridge, MA
02142
800/635-6887
LIST PRICE: $149
REQUIREMENTS: 512K, DOS 2.0 or later version, two floppy drives
TECHNICAL SUPPORT: first six months unlimited, toll-free number, M–F 8:30–8
OTHER SUPPORT: extended support at extra cost
Reader service no. 613

Microsoft Works 2.0
Microsoft Corp.
One Microsoft Way
Redmond, WA
98052-6399
800/426-9400
LIST PRICE: $149
REQUIREMENTS: 512K, DOS 2.0 or later version, two floppy drives
TECHNICAL SUPPORT: unlimited, toll number, M–F 6–5:30
OTHER SUPPORT: CompuServe and GEnie forums
Reader service no. 614

PFS:First Choice 3.1
Spinnaker Software Corp.
201 Broadway
Cambridge MA 02139
800/323-8088,
617/494-1219 (fax)
LIST PRICE: $149
REQUIREMENTS: 512K, DOS 2.1 or later version, two floppy drives
TECHNICAL SUPPORT: unlimited, toll number, M–Th 10–5, F 10–4
OTHER SUPPORT: none
Reader service no. 615

"SURF'S UP. . . AND SO IS MY BUSINESS"

–STEVE CATHEY
President
West Coast Sales Organization
Solana Beach, California



"We sell products from the country's leading manufacturers of surfing related products. In a few short years we grew to where our software wasn't able to keep up with us. That's why we gave up on Microsoft Works™ and turned to Open Access III from SPI. It meets our needs now and we are confident it will meet our needs well into the future!"

If your business is outgrowing your software, now's the time to move up to Open Access III. The fully integrated multi-function software package with the features you demand and power that won't let you down.

Database. *"Open Access III gives us the relational database power we need to effectively manage our business. Microsoft Works forced us to create multiple customer files due to its limited storage capabilities."* Open Access III lets you maintain a virtually unlimited number of records and report files. And Open Access III's easy-to-use programming language and large selection of third-party applications ensure you will always be able to meet your future application requirements.

Spreadsheet. *"Heavy-duty data analysis is easy, since the spreadsheet offers direct query access to database files, unlimited file linking and built-in goal seeking."* With Open Access III's virtual memory management, the size of your spreadsheet is limited only by the size of your hard disk, not by the size of your RAM.

Word Processor. *"No more data translation hassles — OA III's query capability allows us to directly select database records in any order for instant mail merge."* Now you can get custom high-quality output without all the extra work.

Communications and Desk Accessories. *"Since Open Access III is network-ready for four users, it's perfect for our office, while the built-in E-Mail is great for keeping in touch when we're out selling."* In addition to its powerful Communications module, Open Access III includes a full set of desk accessories you'll use every day including an appointment scheduler, business cards, calendar, stopwatch, notepad and calculator.

Move up to Open Access III. It's the clear choice when you need a multi-function software solution that is easy to use, and your business demands software with power to spare.

Make a move today to protect your future. To protect your business. Move up to Open Access III.

FREE DEMONSTRATION DISK OFFER

If you would like to experience the power of Open Access III, call today for a free self-running demonstration disk and the the name of an Open Access III dealer near you.

1-800-937-4774
1-619-450-1526

SPI
Software Products International
9920 Pacific Heights Blvd
San Diego, CA 92121-4330

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Circle 249 on reader service card

THE POWER THAT MOVES YOU...

ZENITH DATA SYSTEMS UPSETS THE BALANCE

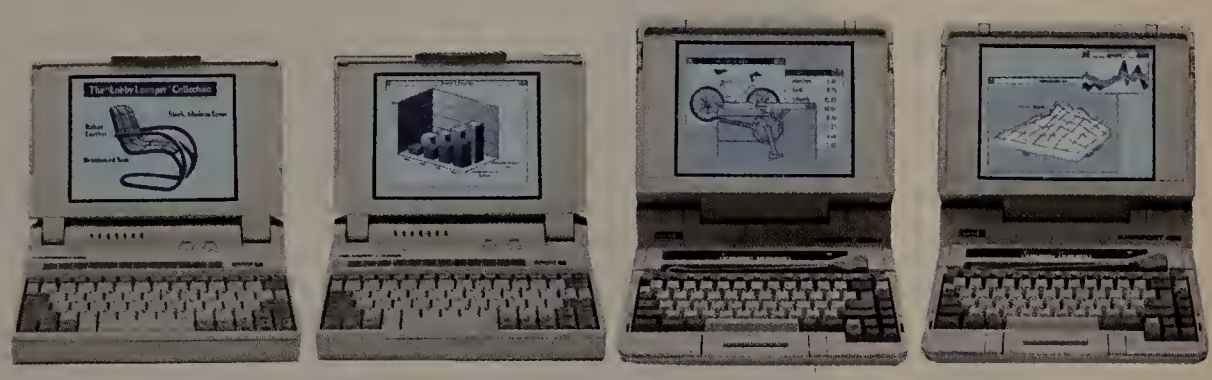
MastersPort 386SL
The fully-featured notebook that sets the standard for the Intel386™ SL microprocessor. Its *Premier System Management*— with two separate resume modes— lets you hold work in active memory for weeks at a time.

INTRODUCING 5 NEW PORTABLES FROM ZENITH DATA SYSTEMS.

The conventional way to look at portable power is from the PC's perspective. The processor. The speed. The memory. At Zenith Data Systems, we believe the proper perspective is yours. How easily you can take full advantage of the power within your PC. A philosophy exemplified by our five new portables. Our breakthrough MastersPort 386SL. The first notebook you can use, and use, and use, without ever thinking about battery life. Our SupersPort battery-powered i486™ laptops — the first ever. Both so advanced, they just might replace your desktop. Plus 286 and 386SX notebooks that are titans on performance. So if you want power without limits, these are the portables to move to. Unquestionably from Zenith Data Systems.

For more information and the name of your nearest Zenith Data Systems Medallion Reseller, call **1-800-523-9393** in North America.

OF POWER.



MastersPort 286 **MastersPort 386SX** **SupersPort 486SX** **SupersPort 486**

ZENITH data systems

Groupe Bull

LOOK INTO THE POWER OF 5 NEW PORTABLES

	MastersPort™ 286	MastersPort 386SX	MastersPort 386SL	SupersPort® 486SX	SupersPort 486
Processor – Speed	286 – 12/6MHz	386SX – 20/10MHz	386SL – 20/5/0MHz	486SX – 20/10MHz	486 – 25/12.5MHz
Co-Processor	80C287 socket	80387SX socket	80387SX socket	Upgradeable to 486-20MHz	Integrated
Memory (Std./Max.)	1MB/2MB	2MB/4MB	2MB/8MB (64K cache)	4MB/16MB	4MB/16MB
Hard Disk Drive	30MB	60MB	60MB	120MB	120MB
LCD/Size	Backlit/8.85"	Backlit/8.85"	Backlit/8.85"	Edgelit/10.7"	Edgelit/10.7"
Video/Gray Scales	VGA/16	VGA/16	VGA/32	VGA/64	VGA/64
Power Management	• Suspend/Resume • Sleep mode • Low battery operation	• Suspend/Resume • Sleep mode • Low battery operation	*Premier System Management*™ • Standby/Resume • Rest/Resume • Panic Save • Unattended communications	*Intelligent Power Management*™	*Intelligent Power Management*
Software	MS-DOS® included	MS-DOS included	MS-DOS pre-installed; Microsoft® *Windows*™ v. 3.0 included	MS-DOS and Microsoft *Windows* v. 3.0 pre-installed	MS-DOS and Microsoft *Windows* v. 3.0 pre-installed
Weight (with battery)	6.6 lbs.	6.6 lbs.	6.8 lbs.	15 lbs.	15 lbs.

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Circle 290 on reader service card

PERS

STAN MUSILEK

CATHY SMITH

DANIEL TYNAN

In a perfect world, every user would have access to a high-speed laser printer. But let's get real—most users aren't networked, and even an "affordable" laser like Hewlett-Packard's LaserJet IIP can run you almost $1000, once you add necessities like paper trays and extra RAM. If you run a small business or need to outfit several users in your work group with printers, you should consider two older yet sometimes wiser choices: dot matrix and ink jet printers.

A 24-pin dot matrix printer offers high-quality text printing at a price between $350 and $1000, plus wide-document and multipart-form printing—two features you simply can't get from a laser. If you need to print graphics too, ink jets provide laserlike output as well as quiet operation and greater portability (see the sidebar "Affordable Graphics Printers—Pretty in Ink"). Dot matrix and ink jet printers can also give you color output on the cheap (see "Buyers' Guide: Color Peripherals," June 1991).

We've uncovered 50 monochrome 24-pin and ink jet printers you can buy for less than $1000. This Buyers' Guide shows you how to find the right printer, whether you're looking for a low-cost machine to put on your desk or a somewhat more expensive wide-carriage model for your work group.

PRIN

O N A L

In the laser printer era, the 24-pin dot matrix printer is doing more than holding its own—it's performing business tasks no laser can. And ink jets make great silent partners.

Pinning Down the Differences

Why buy a dot matrix printer? Three reasons: multipart forms, wide-carriage printing, and bargain prices. Only a dot matrix printer can give you draft and letter quality text for under $500—or $600 and up if you need a wide-carriage model for printing big (11-by-17-inch) spreadsheets.

Dot matrix printers work by striking an inked ribbon with a series of pins. Draft mode uses fewer pins per character, resulting in text printing speeds up to three times faster than with letter quality (LQ) mode but far less readable output. In LQ mode, most 24-pins produce text whose quality approaches laser printers', fine for in-house documents and most business correspondence. Graphics are another story—you're likely to see jaggy curves and visible bands across solid areas. Still, a 24-pin is handy for quick drafts of charts whose final destination is the office laser.

Unless you shell out big bucks for a high-speed line printer (not included here), your dot matrix device will generally be slower than even a 4-page-per-minute laser. The maximum speed ratings shown in the table (measured in characters per second, or cps) are vendor estimates—expect actual performance to be 15 to 20 percent slower.

T E R S

PRINTERS WITH IMPACT—24-PIN MODELS UNDER $1000

				STANDARD FEATURES		TYPOGRAPHICAL FEATURES			PAPER HANDLING	
		List price								
Manufacturer	Product	Narrow carriage	Wide carriage	Rated speed (LQ/draft, cps)	Buffer size (standard/maximum)	Resident fonts	Font cartridges available	Supports downloaded fonts	Paper advance at end of job	Form parking
ADVANCED MATRIX TECHNOLOGY	Accel-242	$425	$625	75/225	8K/32K	4	3	Y	Y	Y
AEG OLYMPIA	NP 80-24E	$499		67/200	24K/56K	6	1	Y	Y	Y
	NP 136-24		$699	80/240	24K/56K	6	1	Y	Y	Y
ALPS AMERICA	Allegro 500	$499		60/180	12K/44K	7	0	Y	Y	Y
	Allegro 500XT		$799	83/250	23K/55K	7	0	Y	Y	Y
	ALQ224/GX	$799	$999	93/280	23K/64K	5	[1]	Y	Y	Y
BROTHER INT'L	M-1324	$399		72/216	64K/96K	7	1	Y	Y	Y
	M-1B24L	$749	$949	75/225	64K/96K	5	1	Y	Y	Y
CITIZEN AMERICA	GSX-140	$499	$649	64/192	8K/40K	6	0	Y	Y	Y
C-TECH ELECTRONICS	ProWriter C-510	$639	$749	80/240	26K/26K	3	14	Y	Y	Y
	ProWriter C-610+	$799		80/240	26K/26K	3	14	Y	Y	Y
DATAPRODUCTS	9034	$899	$1099	83/300	32K/32K	2	4	N	N	Y
DIGITAL EQUIPMENT	LA 70	$499		40/200	2K/2K	1	0	Y	Y	Y
	LA 75	$835		42/250	2K/2K	1	2	Y	Y	Y
EPSON AMERICA	LQ- 200	$399		64/192	8K/40K	10	0	Y	N	N
	LQ-570	$499[2]		84/252	8K/40K	12[3]	0	Y	Y	Y
	LQ-870	$749[2]	$1099[2]	110/330	8K/40K	12[3]	0	Y	Y	Y
FACIT	B 2400	$699	$849	78/240	26K/26K	2	14	Y	Y	Y
IBM	PS/1	$449		53/92	5K/5K	4	0	N	N	Y
	ProPrinter X24E	$859	$1099	96/288	14K/14K	4	0	Y	Y	Y
MANNESMANN TALLY	MT 82	$499		64/192	11K/11K	3	0	Y	Y	Y
	MT 130/24	$899	$999	150/300	17K/32K	7	4	Y	Y	Y
NEC TECHNOLOGIES	Pinwriter P3200	$429	$599	72/216	8K/8K	7	0	N	Y	Y
	Pinwriter P6200	$749	$999	100/300	80K/80K	8	8	N	Y	Y
OKIDATA	Microline 380	$349		60/180	8K/8K	6	0	Y	Y	Y
	Microline 390 Plus [4][5]	$699	$949	90/270	23K/40K	6	1	Y	Y	Y
OLIVETTI OFFICE USA	DM124	$499		50/200	40K/40K	13	0	Y	N	Y
PANASONIC	KX-P1123	$369.95		63/240	10K/42K	7	0	Y	Y	Y
	KX-P1124i [6]	$499.95		100/300	12K/44K	11	0	Y	Y	Y
	KX-P1654		$949.95	125/375	42K/72K	11	0	Y	Y	Y
SEIKOSHA	LT-20	$499		60/180	1K/12K	1	8	Y	Y	N
	SL-90 Plus	$549		80/240	12K/12K	9	0	Y	Y	Y
	SL-230		$998	92/277	5K/64K	9	0	Y	Y	Y
STAR MICRONICS	NX-2410 Multi-Font	$399		75/225	7K/39K	8	3	Y	N	Y
	NX-2420 Multi-Font	$449		100/250	7K/39K	10	6	Y	Y	Y
	XB-2410 Multi-Font	$699	$899	100/300	27K/155K[7]	17	0	Y	Y	Y
	XB-2420 Multi-Font	$799	$999	125/375	29K/157K[7]	27	6	Y	Y	Y
TANDY	Tandy DMP 240	$549.95		64/192	8K/40K	5	0	Y	Y	Y
	Tandy DMP 302	$599		75/270	32K/32K	7	0	Y	Y	Y
	Tandy DMP 2104		$599	80/240	2K/32K	2	0	Y	Y	Y
	Tandy DMP 2103		$899	90/270	32K/32K	7	0	Y	Y	Y
TOSHIBA AMERICA INFORMATION SYSTEMS	ExpressWriter420	$499	$699	80/240	28K/28K	5	0	Y	Y	Y
UNISYS	AP1337	$699	$949	90/270	8K/40K	8	1	Y	Y	Y

[1] Information unavailable from vendor.
[2] Price subject to change.
[3] Two fonts are scalable from 8 to 32 points.
[4] Extra-cost option.
[5] 1989 Best Buy.
[6] 1990 World Class Award Winner.
[7] Wide-carriage model's buffer is bigger.

FRONT PANEL CONTROLS											
Optional sheet feeder	Single cut-sheet feed	Multipart forms (maximum parts)	Envelopes/ labels	Pitch	Font selection	Line spacing	Micro linefeed	Margins	Warranty (years)	Mean time between failures at haurs of printing per day	Reader service number
Y	Y	3	Y/Y	Y	Y	Y	Y	Y	1	5000 at 2	645
Y	Y	3	Y/Y	Y	Y	Y	N	Y	1	6000 at 1.6	646
Y	Y	3	Y/Y	Y	Y	y	N	Y	1	6000 at 1.6	646
Y	Y	4	Y/Y	Y	Y	Y	Y	N	1	6250 at 1.6	647
Y	Y	4	Y/Y	Y	Y	Y	Y	N	1	7500 at 1.6	647
Y	Y	5	Y/Y	Y	Y	Y	N	N	1	7500 at 1.6	647
Y	Y	3	N/Y	Y	Y	Y	N	Y	1	4000 at 2	648
Y	Y	4	N/Y	Y	Y	Y	N	Y	1	6000 at 2	648
Y	Y	4	Y/Y	Y	Y	Y	Y	Y	2	4000 at 6	649
Y	Y	4	Y/Y	Y	Y	Y	Y	Y	2	6000 at 2	650
Y	Y	5	Y/Y	Y	Y	Y	Y	Y	2	5800 at 2	650
Y	Y	4	N/Y	Y	Y	Y	Y	N	1	5000 at 1	651
Y	Y	3	Y/Y	Y	N	Y	N	N	1	[1]	652
Y	Y	4	Y/Y	Y	N	Y	N	N	1	[1]	652
Y	Y	3	Y/Y	N	Y	N	Y	N	2	4000 at 2	653
Y	Y	4	Y/Y	N	Y	N	Y	N	2	4000 at 2	653
Y	Y	4	Y/Y	Y	Y	Y	Y	Y	1	[1]	654
Y	[4]	4	Y/Y	N	Y	N	N	Y	1	[1]	655
Y	Y	4	Y/Y	N	N	N	N	N	1	[1]	655
Y	Y	3	Y/Y	Y	Y	N	N	N	1	2000 at 2	656
Y	Y	6	Y/Y	Y	Y	Y	Y	N	1	7800 at 2	656
Y	Y	3	Y/Y	Y	Y	N	Y	Y	1	4000 at 2	657
Y	Y	4	Y/Y	Y	Y	N	Y	Y	1	6000 at 2	657
Y	Y	3	Y/Y	Y	Y	Y	Y	Y	1	4000 at 2	658
Y	Y	4	Y/Y	Y	Y	Y	Y	Y	1	5000 at 2	658
Y	Y	3	Y/Y	Y	Y	Y	N	Y	1	5000 at 4	659
Y	Y	4	Y/Y	Y	Y	Y	Y	Y	2	4000 at 2	660
Y	Y	4	Y/Y	Y	Y	Y	Y	Y	2	5000 at 2	660
Y	Y	4	Y/Y	Y	Y	Y	Y	Y	2	6000 at 2	660
N	Y	3	N/Y	N	N	N	N	N	2	4000 at 1	661
Y	Y	3	N/Y	Y	Y	N	N	Y	2	4000 at 1	661
Y	Y	4	Y/Y	Y	Y	N	N	Y	2	5068 at 1	661
Y	Y	3	N/Y	Y	Y	N	Y	N	2	4000 at 6	662
Y	Y	5	Y/Y	Y	Y	N	Y	N	2	5000 at 4.8	662
Y	Y	4	Y/Y	Y	Y	Y	Y	Y	2	4000 at 6	662
Y	Y	5	Y/Y	Y	Y	Y	Y	Y	2	7000 at 4.8	662
Y	Y	4	Y/Y	Y	Y	Y	N	Y	1	5000 at 2	663
Y	Y	4	Y/Y	Y	Y	Y	Y	Y	1	5000 at 2	663
N	Y	4	Y/Y	Y	Y	Y	Y	Y	1	6000 at 2	663
Y	Y	4	Y/Y	Y	Y	Y	Y	Y	1	5000 at 2	663
Y	Y	4	Y/Y	Y	Y	Y	Y	Y	2	6000 at 2	664
Y	Y	5	Y/Y	N	Y	Y	N	N	1	6000 at 2	665

For more information about all products in this table, circle reader service no. 904.

If all you need is draft output, it doesn't matter what fonts come with the printer. If you want to print out correspondence and reports, however, you'll want at least three built-in fonts, plus the ability to add more via optional font cards or downloading. (Most 24-pins come with a limited supply of typefaces in fixed sizes, though Epson's new LQ-570 and LQ-870 let you scale fonts from 8 to 32 points.) Usually, the bigger the print buffer, the better. You'll want at least an 8K buffer to spool large print jobs; demand

32K or more if you want to download software-based fonts.

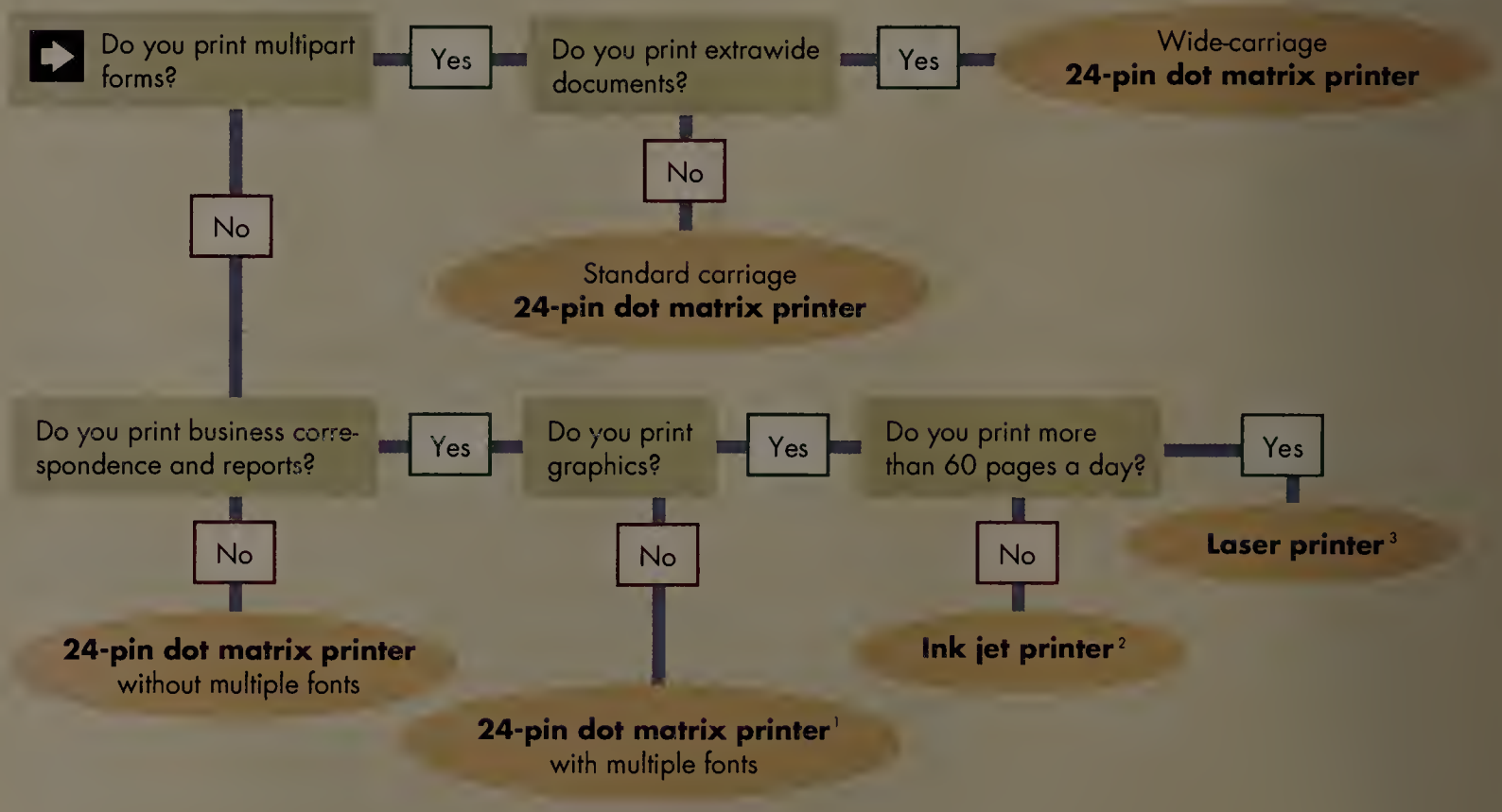
If you value your sanity, top-notch paper handling is a must. Automatic paper advance means you won't need to roll the fanfold forward and back every time you tear off a sheet. Form parking saves you from having to unload the fanfold paper every time you need to print on a single sheet of letterhead. Also look for the capability to print envelopes and labels—or be prepared to keep a typewriter nearby.

Even the best laser can't print on multipart forms. Most shipping labels, invoices, and other standard forms require an impact device that can leave a strong impression; ideally, your 24-pin printer should be able to handle at least four-part forms (one original plus

KNOW YOUR OPTIONS

The Right Personal Printer

Sometimes the best printer for your desktop isn't the most expensive. Whether you choose a dot matrix, an ink jet, or a laser depends on the kind of print jobs you do.



[1] Printed on Epson's LQ-570.

a face,

[2] Printed on Hewlett-Packard's DeskJet 500.

a face,

[3] Printed on Hewlett-Packard's LaserJet IIID.

a face,

AFFORDABLE GRAPHICS PRINTERS—PRETTY IN INK

MANUFACTURER Printer	List price	STANDARD FEATURES: Rated speed (LQ/draft, in cps)	STANDARD FEATURES: Buffer size (standard/ maximum)	STANDARD FEATURES: Graphics resolution (dpi)	TYPOGRAPHIC FEATURES: Resident fonts	TYPOGRAPHIC FEATURES: Font cartridges available	TYPOGRAPHIC FEATURES: Supports downloaded fonts	PAPER HANDLING: Optional sheet feeder	PAPER HANDLING: Envelopes/ labels	Warranty (years)	Reader service number
CANON USA											
BJ-10e	$499	83/142	37K/37K	360	8	0	Y	Y	Y/Y	1	666
BJ-300	$799	300/600	30K/158K	360	18	3	Y	Y	Y/Y	1	666
BJ-330[1]	$949	300/600	30K/158K	360	18	3	Y	Y	Y/Y	1	666
EASTMAN KODAK											
Kodak Diconix 150 Plus	$519	52/180	2K/2K	192	13	0	N	N	N/N	1	667
HEWLETT-PACKARD											
HP DeskJet 500	$729	120/240	16K/16K	300	4	20	Y	N	Y/Y	3	668
IBM											
ExecJet[1]	$1099	150/300	30K/128K	360	18	3	Y	Y	Y/Y	1	669
OLIVETTI OFFICE USA											
JP 350	$729	120/360	40K/256K	300	3	16	Y	Y	Y/Y	1	670

[1]Wide-carriage model.

For more information about all products in this table, circle reader service no. 905.

Most of us can't live by text alone. And while you can print a pie chart or clip art on a dot matrix, you may be less than thrilled with the results. When you need to print graphics as well as text and can't afford a laser, an ink jet is a excellent compromise.

Though a tad more expensive than their dot matrix cousins, ink jets are also generally smaller and quieter—perfect for cramped desktops where the printer sits right next to the phone. On the other hand, they can't print multipart forms, and only the Canon BJ-330 and the IBM ExecJet can handle wide paper.

Like dot matrix printers, ink jets print pages one line at a time, and at comparably slow speeds. But instead of striking an inked ribbon, an ink jet sprays fine streams of liquid ink onto the page, creating laserlike text and graphics.

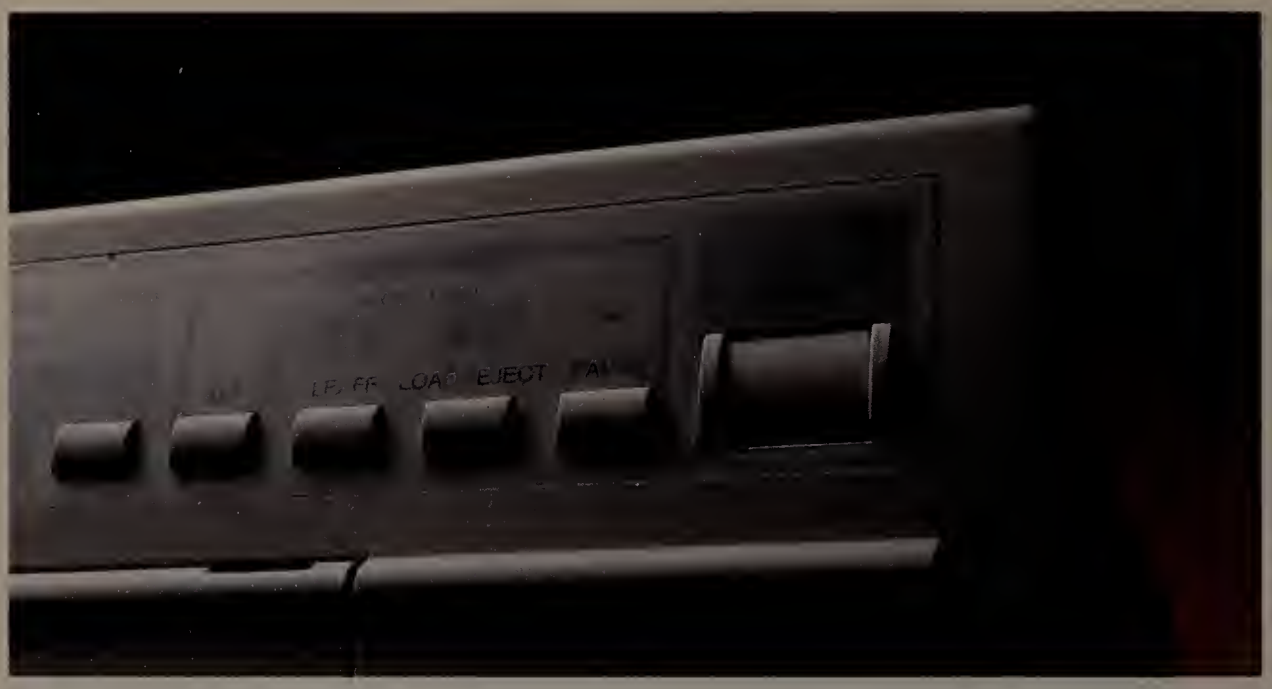
The primary issue is output quality, which can vary depending on the type of paper. With some paper, the ink seeps into the fibers, creating fuzzy text and wrinkled solid areas. Before you buy, be sure to print out samples on the types of paper you're likely to use.

Output durability is also key. In the old days, if an ink jet page got wet, it looked like a Jackson Pollock painting—a series of blotchy smears. HP's new water-resistant inks reduce the problem for DeskJet users, but for others the quality varies. To gauge smearing, lick your thumb and rub it across a freshly inked page.

Most of the rules for buying dot matrix printers also apply to ink jets. You'll want a healthy selection of font options, but since all the ink jets handle single cut sheets, paper handling and control panel options are generally less important. All the printers deliver solid software compatibility by offering Epson or IBM emulation.

Finally, consider portability. The Canon BJ-10e and the Kodak Diconix 150 Plus weigh in at under 5 pounds each—slightly less than the lone dot matrix luggable, the Seikosha LT-20. For printing on the road (as well as on the desktop), an ink jet may be your best bet.

STAN MUSILEK



STAN MUSILEK

three copies).

All the printers listed here provide either Epson or IBM emulation—a virtual guarantee that your software applications can send copy to them. But Murphy's Law guarantees that just when the deadline is tightest, you'll need to do something that your application can't handle. Look for front-panel controls that let you set pitch, font, line spacing, and margins. Micro linefeed, which lets you adjust paper position with greater precision, is an especially handy feature.

Finally, look for a printer that will last. Your only indicator is its *mean time between failures* rating—the vendor's estimate of how long the printer will work before requiring service, based on a specified amount of use per day. For example, "4000 at 2" means the printer should run at least 4000 hours without a hitch if you use it 2 hours a day.

Dot's All, Folks

Smart shoppers know that sometimes old, proven technology has its advantages. If you need an affordable personal printer—and especially if forms and wide-carriage printing are part of your picture—a 24-pin model will please you and your wallet.

Cathy Smith is an editorial assistant and Daniel Tynan an associate editor for PC World.

WHERE TO BUY

Advanced Matrix Technology
765 Flynn Rd.
Camarillo, CA 93012
800/637-7878,
805/484-5282 (fax)

AEG Olympia
1330 River Bend #600
Dallas, TX 75247
214/631-1031,
214/288-1764 (fax)

Alps America
3553 N. First St.
San Jose, CA 95134
800/825-2577

Brother Int'l Corp.
200 Cottontail Ln.
Somerset, NJ 08875
908/356-8880 ext. 4504,
201/469-4415 (fax)

Canon USA
One Canon Plaza
Lake Success, NY 11042
516/488-6700

Citizen America Corp.
2450 Broadway #600
P.O. Box 4003
Santa Monica, CA 90411-4003
213/453-0614,
213/453-2814 (fax)

C-Tech Electronics
2515 McCabe Way
P.O. Box 19673
Irvine, CA 92713
800/347-4017,
714/757-4533 (fax)

DataProducts
6219 DeSoto Ave.
P.O. Box 746
Woodland Hills, CA 91365-0746
818/887-8000,
818/887-3816 (fax)

Digital Equipment Corp.
146 Main St.
Maynard, MA 01754-2571
508/493-5111

Eastman Kodak Co.
901 Elmgrove Rd.
Rochester, NY 14653
800/242-2424,
716/726-3108

Epson America Inc.
20770 Madrona Ave.
Torrance, CA 90503
800/922-8911,
800/289-3776

Facit
University Center
400 Commercial St.
Manchester, NH 03108-9549
603/647-2700,
603/647-2724 (fax)

Hewlett-Packard Co.
19310 Pruneridge Ave.
Cupertino, CA 95014
800/752-0900,
208/344-4809 (fax)

IBM
Old Orchard Rd.
Armonk, NY 10504
800/426-2468

Mannesmann Tally Corp.
8301 S. 180th St.
Kent, WA 98032
800/843-1347,
206/251-5520 (fax)

NEC Technologies
1414 Massachusetts Ave.
Boxborough, MA 01719
800/632-4636

Okidata
532 Fellowship Rd.
Mount Laurel, NJ 08054
800/654-3282
609/778-4184 (fax)

Olivetti Office USA
765 U.S. Hwy. 202
Bridgewater, NJ 08807-0945
800/527-2960,
908/526-8200,
908/526-8405 (fax)

Panasonic
Two Panasonic Way
Secaucus, NJ 07094
800/346-4768

Seikosha
10 Industrial Ave.
Mahwah, NJ 07430
800/338-2609,
201/818-9175 (fax)

Star Micronics
420 Lexington Ave.
#2702
New York, NY 10170
800/447-4700

Tandy Corp.
1800 One Tandy Center
Fort Worth, TX 76102
817/390-3011

Toshiba America Information Systems, Inc.
Electronic Imaging Division
9740 Irvine Blvd.
Irvine, CA 92718
714/583-3000,
714/583-3522 (fax)

Unisys
P.O. Box 500
Blue Bell, PA 19424
215/986-4011

MANAGE
the unmanageable

As an executive consultant with Data Systems Inc., Alexandria, Virginia, Jack Anderson was used to pressure, but this time he was really in trouble . . .

"InstaPlan has unparalleled ease of use and sophistication"

The client needed a proposal for updating its outmoded floppy based PC wordprocessing system. These studies normally take weeks or even months to complete. Interviews, document reviews, procedures analysis, communications studies and many other factors must all be taken into account. To make matters worse, not only did the client need it in a week, but the client was a friend, whose new job depended on Jack delivering the goods by Friday. Understandably, Jack was nervous.

With no room for error, Jack turned to the world wide leaders in full service project management, Micro Planning International. In addition to consulting and training services, MPI provides powerful but easy to use software for DOS, Windows and Macintosh computers, Jack chose InstaPlan (IP) and was up and running in minutes. He found its outline approach let him start with his broad objectives, working down into more detail as needed.

To hit this deadline, Jack was going to have to leverage client resources. InstaPlan's superb graphical reports (Gantt, PERT, and Resource Spreadsheet) allowed Jack to communicate quickly and effectively what was needed, when and by whom.

By Friday, the proposal was ready and accepted as the framework for the client's automation program. In Jack's own words, "I couldn't have done it without InstaPlan. It's unparalled in ease of use and sophistication."

Announcing InstaPlan 3.0!

The informed choice for Project Management and Proposals just got better

Easiest to Use:

InstaPlan's easy outline approach works the way you think. Start with the broad objective and work down to the details as necessary. Proposals and plans can be laid out by novices in minutes.

"Learning to set up and edit a project is easier with InstaPlan than any other program"

Software Digest

#1 Ease of Use
#1 Ease of Installation
#1 Overall value

CORPORATE PC WEEK SATISFACTION POLL

Full featured:

With InstaPlan's full range of features, Why pay more?

	InstaPlan	Time Line
Outline Approach	✓	✓
Resource Driven Scheduling	✓	✓
Multi-Project Analysis	✓	✓
Progress Tracking	✓	✓
What if (Undo/Redo)	✓	✓
Presentation Graphics		
- Gantt Charts	✓	✓
- PERT Charts	✓	✓
- Resources Histograms	✓	✓
- C/SSR Costing Charts	✓	No
Multiple Resource Calendars	✓	No
Plotter support*	✓	✓
WBS Codes*	✓	✓
File Locking on Networks*	✓	✓
Suggested Retail Price	$249	$695
EMS Version SR Price	$549	$695

* New in Version 3.0

PERSONAL COMPUTER EDITOR'S CHOICE

INFO WORLD EXCELLENT VALUE

PC WORLD BEST BUY

Best Buy:

At $249, InstaPlan is a fraction of the cost of equivalent project management software with comparable features. The EMS Version at $549 is even better value for those with large projects (10,000+ tasks) or many independent projects to manage.

PC MAGAZINE EDITORS' CHOICE

Special offer! Upgrade from Time Line® or Harvard™ PM for only $79. Call for details!

Full Service Project Management from

MPI

Micro Planning International
655 Redwood Highway, Suite 311
Mill Valley, CA 94941
(415) 389-1414

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Bristol • Washington D.C. • Sydney

InstaPlan (800) 852-7526
30 day money back guarantee.

PCW 8/91

VISA/MC/AMEX/Checks
Add $10 S & H: $10 Canada: $60 International:
CA/FL residents add 6% Sales Tax.

☐ Send InstaPlan 3.0 $249
☐ Send InstaPlan EMS $549
☐ 5 1/4" disk
☐ 3 1/2" disk

Send info on:
☐ Version for Windows
☐ Consulting/Training

Recommended Configuration: IBM PC/XT/AT/PS 2 & Compatibles 640K RAM Hard Disk. Printers Supported: IBM ProPrinter & Graphics Printer, Epson FX/MX/RX/LQ. Okidata Plug 'n Play 192/3, 292/3, Toshiba 351, HP LaserJet+/Series II/IID/III DeskJet, ThinkJet, QuietJet. Plotters Supported: Hewlett Packard & Com-

Card # _____ Expires: _____

Signature: _____

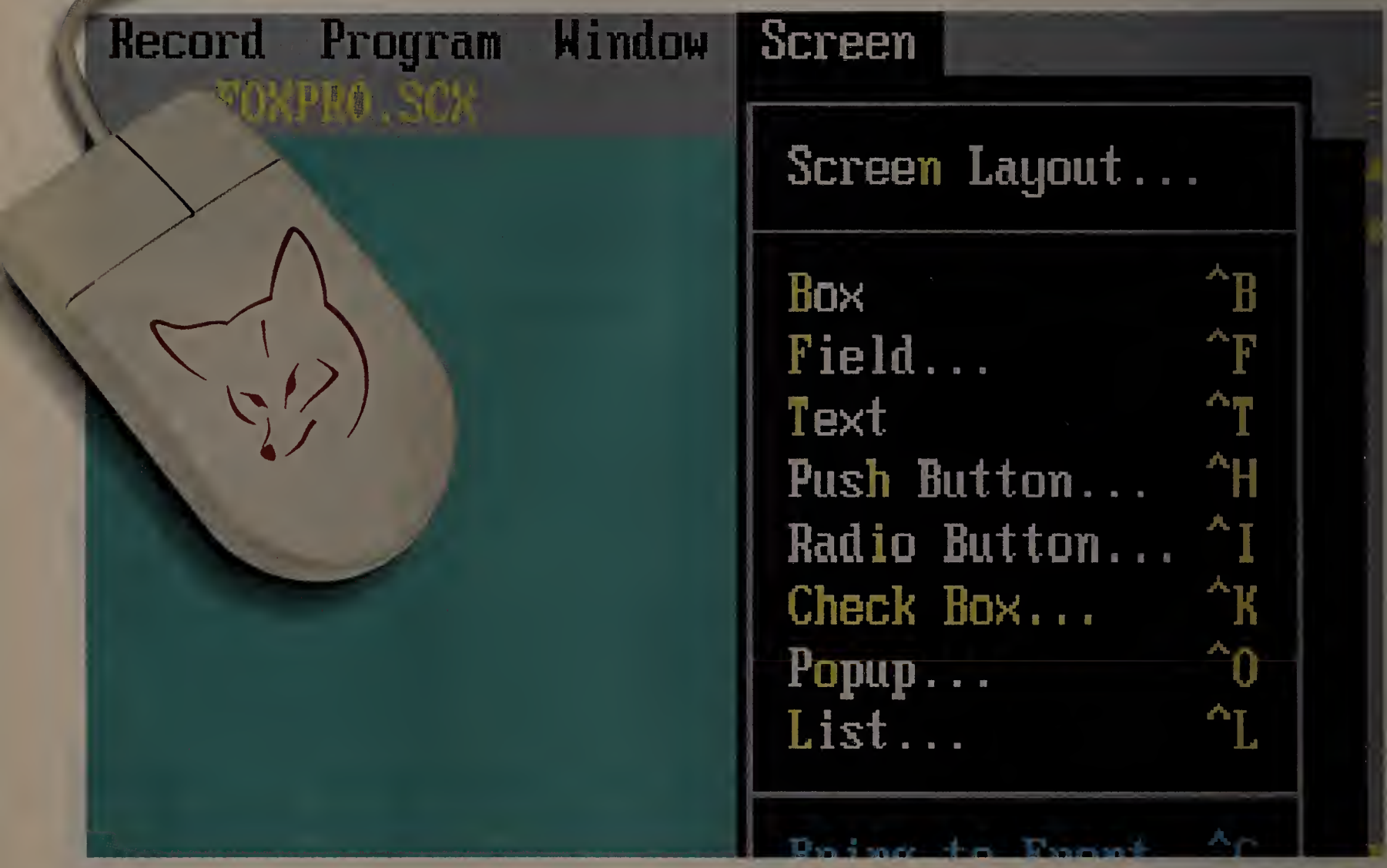
Name: _____

Company: _____

Address: _____ Phone: _____

City: _____ State: _____ Zip: _____

Introducing the DBMS runs like a mainframe.



Admit it .

Don't you get just a twinge of envy when you see a Mac user having fun while getting the job done?

You're not alone.

Millions of users who needed the power of the PC but wanted the ease-of-use of a Graphic User Interface (GUI) just splurged on Windows and the expensive hardware needed to get the most out of it.

But you don't have to do that.

Because now there's FoxPro®2.0.

Why should the rich have all the fun.

FoxPro 2.0 gives you the ease-of-use of a Graphic User Interface on your character-based DOS PC.

Use pull-down menus to open multiple windows (in DOS) and see all the data you need to see at once. Build easy-to-use screens for entering and viewing data just by picking-and-clicking to place menus, buttons, checkboxes and scrolling lists anywhere you want them. Create sophisticated, elegant reports without the usual pain. Then assemble

that acts like a Mac and In DOS.

everything into your own custom applications.

Without writing a single line of programming code.

But that's only the tip of the iceberg.

Beneath its Mac-like interface, FoxPro delivers all the power and technology needed for your database management systems in the 1990s.

Our new memory management techniques let you work with the memory you have now while speeding up your applications.

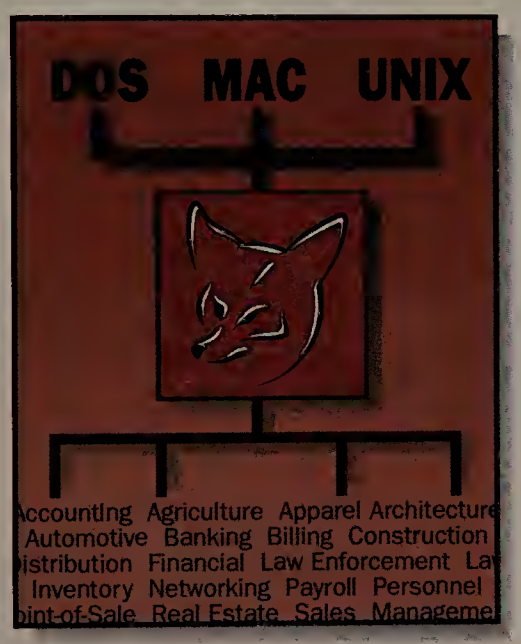
Our new compound indexes are less than a quarter the size of those in competitive products and far, far faster.

Our new Relational Query-By-Example (RQBE) is a simpler, interactive interface to the information you need.

Our new Rushmore™ query optimization† accesses that information two orders of magnitude or more faster‡ than ever before.

You'll like being able to seamlessly use the SQL SELECTs that RQBE creates in any of your applications. (And the new UPDATE, INSERT and CREATE TABLE commands, too.)

And you'll love the fact that to the rich development environment we've always had, we've added a project manager that keeps track of all the needed files and any changes, then automatically builds your application or .EXE files. An API that lets you dynamically link to libraries you write in C or assembler with a single FoxPro command. A BROWSE FOR that's the basis for an entire application itself. Fourth Generation Language (4GL) tools that make adding event-driven code to fully relational screens, menus, reports and labels a snap.



And we've made our networking even better than when NSTL said:* "... multiuser databases fall into two general performance categories: FoxPro/LAN and all the others ..."

There isn't a DBMS in existence with the power of FoxPro.

The bigger your business, the bigger your investment.

So we've maintained downward compatibility with your existing systems, and you can use FoxPro 2.0 to run your current dBASE (and Fox) applications on your present character-based DOS PCs.

While you develop better, faster database management systems using all the advanced power of FoxPro 2.0 to satisfy your future information processing needs.

To get the most out of your investments, call and ask about our Upgrade-Any-DBMS-for-$195 offer.

Call now for your FREE demo disk.

FoxPro 2.0 runs on a 512K XT yet in extended mode uses every bit of power in a 386 or 486. To try it yourself, call Fox Software for a free copy of our fully-featured demo or the name of your nearest dealer.

You'll be amazed at what FoxPro 2.0 can do for you. In DOS.

Call 1-800-837-FOX2 or 419-874-0162 today.

(Ask for Offer PCD-801)

FoxPro 2.0

The complete power trip.™

† Patent applied for. ‡ A PC and FoxPro beat a mainframe and DB2 with a million-record, 200 megabyte database! * Quote from Software Digest Ratings Report, Vol. 7, Issue 13 (Oct. 1990) refers to FoxPro 1.02. Software Digest is a registered trademark of NSTL, Inc. Upgrade price valid only in U.S.A. and Canada. FoxPro TM Fox Holdings Inc. © Fox Holdings Inc. 1991.

Circle 76 on reader service card

286 SYSTEMS

The good old 12-MHz 286 PC is still a bargain, especially for work-at-home users—and 16-MHz units make surprisingly fast Windows machines. Here's how to choose the best from 73 models.

MARCIA STEIGER

CATHY SMITH, MICHAEL GOODWIN, AND TJ BYERS

Need an inexpensive PC for your home office? Or a LAN workstation to run multiuser software from a server? A 286 will get your work done at a price that's hard to resist. These nonsense machines come in several varieties, with clock speeds from 8 to 20 MHz. The models listed here, 12 MHz and 16 MHz, average about the same price: $2200 for a fully equipped configuration. However, a 12-MHz machine may cost a few hundred less than a 16-MHz unit from the same manufacturer.

Even a 12-MHz 286 is sufficient for tasks like word processing, where speed isn't critical. And the 16-MHz speedsters deliver unexpectedly strong performance with *Windows* (see the sidebar "286—Windows Spoken Here").

We've divided this Buyers' Guide of 73 286 systems into two sections based on CPU speed. Although the 16-MHz chip runs as reliably as the 12-MHz version, major vendors seem to prefer the 12, so if company size and stability are more important to you than performance, a 12-MHz system from one of those companies may be a better choice.

Here are the key issues that you need to consider before you buy.

LIST PRICE

Prices are based on a configuration designed to run *Windows* or RAM-hungry DOS applications like *1-2-3:* 4MB of RAM, an 80MB to 120MB hard disk, a floppy drive, one parallel and one serial port, a VGA color graphics card, a VGA color monitor, a 101-key keyboard, a mouse, and DOS 3.3 or a later version. When you buy through a dealer, expect a discount of 20 to 30 percent off list price.

CPU SPEED

The speed of your applications depends on many factors, including your hard disk and video board, but, all else being equal, the faster the CPU the faster the PC.

FAST RAM

Eventually, most users will want to install at least 4MB of *fast RAM* (memory that runs at the same speed as the CPU). Many of today's high-powered DOS applications—not to mention *Windows*—use a lot of RAM. You can always add RAM by placing it on an expansion board, but this degrades performance.

EXPANDABILITY

Most 286 PCs boast a small, 16-by-16-inch footprint that's just right for crowded desktops, but the compact size means fewer expansion slots and drive bays. If you're going to network your 286 and share the server's hard disk and peripherals, this may not be a problem. But for stand-alone computing, make sure you get at least four free 8/16-bit slots (after the disk controller and video card are installed) to accommodate peripherals like scanners, fax-modems, and network boards. For stand-alone computing you'll also want at least four drive bays, with three externally accessible to hold two floppy drives and a tape drive. And unless you're definitely going the workstation route, don't buy anything smaller than an 80MB hard disk—you will find 40MB drives are not significantly cheaper.

DESIGN AND CONSTRUCTION

Conveniences like front-panel power and reset switches are nice, and with a switchless setup you can make changes—in memory size, for instance—without fiddling with jumpers or DIP switches. Since preferences in keyboard touch vary, type a few paragraphs before you buy.

WARRANTY AND TECHNICAL SUPPORT

All the vendors listed provide at least a 12-month warranty, but 24 months is even better—as long as it doesn't cost extra. Free on-site service and a central tech support line can be godsends, especially if you're at home or in an office with no support technicians. If the vendor handles service and support via local dealers, look for dealer training so your questions will be answered correctly.

The 286 may be aging technology, but it can still do the job and do it economically. Whether you're in the market for a 12-MHz workhorse or a 16-MHz thoroughbred, if you choose the right 286 you'll enjoy years of useful service.

Cathy Smith is an editorial assistant, Michael Goodwin an associate editor, and TJ Byers a contributing editor for PC World.

12-MHz 286 COMPUTERS

			STANDARD FEATURES									
Manufacturer	Model	Price[1]	CPU speed (MHz)	Fast-RAM capacity (MB)	8/16-bit slots	8-bit slots	Max. number of third-/half-/full-height drives	Externally accessible bays	Largest hard disk sold with machine	Parallel ports	Serial ports	Dedicated mouse port
ACER	915P(II)	$1249	12	5	2	0	0/4/0	1	100MB	1	2	Y
	AcerStotion II	$1195	12	5	2	0	0/2/0	1	100MB	1	2	N
ADVANCED LOGIC RESEARCH	PowerFlex 40	$1295	12.5	5	1	0	2/2/0	4	100MB	1	1	N
	PowerFlex 286	$2843	12.5	5	5	1	2/2/0	3	80MB	1	1	N
AEG OLYMPIA	D286/12	$3345	12.5	4	5	3	0/5/0	3	200MB	1	2	N
ARCHE TECHNOLOGIES	Triumph 286 Plus	$3265	12	4	3	2	0/2/2	4	338MB	1	2	Y
BLACKSHIP COMPUTER SYSTEMS	BLK286/12	$1395	12	4	6	2	2/4/0	3	200MB	1	2	N
BOSS TECHNOLOGY	Tomcat 286/12	$2695	12	5	3	2	1/2/0	2	200MB	1	2	N
DATAWORLD	Doto 286-12	$2205	8/12[4]	4	4	2	0/5/0	3	676MB	1	2	N
DELL COMPUTER	Dell System 210	$2678	12.5	6	3	0	2/1/2	2	100MB	1	2	N
DFI	DFI 286/12	$1495	12	4	5	3	4/3/0	3	340MB	1	2	N
ELTECH RESEARCH	1120S	$1779	12	8	6	2	1/3/0	3	200MB	1	2	N
EPSON AMERICA	Equity 286 Plus	$4120	12	5	3	1	1/3/0	2	200MB	1	1	Y
EPS TECHNOLOGIES	EPS 80286-12	$1795	12	8	6	2	0/5/0	3	200MB	1	2	Y
ESC COMPUTERS	ESC286-12Z	$1450	12	4	5	3	0/5/0	3	1.2GB	1	2	N
EVEREX	Tempo 286/12	$2040	12	4	6	2	0/3/0	2	200MB	1	2	N
	Tempo 286/12c	$1999	12	4	4	0	2/1/0	2	200MB	1	2	N
FASTMICRO	FostDoto 286/12	$1679	12	8	6	2	7/3/3	3	200MB	1	2	N
FLYTECH TECHNOLOGY	FT 9200 Series	$1559	12	1	0	1	0/2/0	1	80MB	1	2	N
FORTRON	Fortron 286-12	$1750	12	4	5	1	2/2/1	3	200MB	1	2	N
HIQUALITY	HiQ 286/12	$1295	12/16[4]	8	6	2	0/2/3	0	100MB	1	2	Y
JADE COMPUTER	ProTurbo 286	$1648	12	8	4	1	0/3/0	0	383MB	1	2	Y
LEADING SPECT	Leoding Spect	$1495	12	4	6	2	0/5/0	0	120MB	1	2	N
METRA INFORMATION SYSTEMS	M-212	$1445	12	4	5	2	0/4/0	3	200MB	1	2	N
NCR	PC286	$3085	12	5	2	0	0/2/0	1	120MB	1	2	N
NEC TECHNOLOGIES	PowerMate 286/12	$4496	12	5	4	0	0/3/0	2	140MB	1	1	Y
THE NETWORK CONNECTION	Triumph 2000/12-4	$1995	12	4	6	2	0/3/0	3	200MB	1	2	N
POLYWELL COMPUTERS	Poly 286-12Fox	$1398	12	4	4	2	2/3/0	5	200MB	2	2	N
PROTEUS TECHNOLOGY	286 GTX	$1385	12	4	6	2	2/3/0	4	230MB	1	2	Y
SUN MOON STAR	System 286-12	$2339	12	4	3	0	0/4/0	3	200MB	1	2	N
SUNNYTECH	STI 286-12	$1295	12	16	8	0	1/3/0	3	210MB	1	2	N
SUPER COMPUTER	Super IAT 12Mhz	$1495	12	4	6	2	0/5/0	3	200MB	1	2	N
TATUNG	TCS-7450	$1595	12	5	3	0	2/1/0	2	200MB	1	2	Y
	TCS-7120	$1650	12	4	3	1	3/0/0	2	200MB	1	2	Y
TELEVIDEO	286se	$2625	12.5	1	3	0	0/1/0	1	200MB	1	2	N
	286e	$3220	12.5	4	5	1	0/3/1	3	200MB	1	2	N
TWINHEAD	SuperSet 400II/12V	$2138	12	5	4	0	2/4/0	3	200MB	1	2	N
	Netstotion 12V	$2129	12	5	2	0	2/0/0	1	200MB	1	2	N
ULTRA COMP	Ultro 286-12	$2115	8/12[4]	4	5	3	0/5/0	3	200MB	1	2	N
UNISYS	PW 300/12	$4989	12	8	3	1	0/2/0	1	170MB	1	1	N

[1] Price based on 4MB RAM, 1.2MB or 1.44MB floppy drive, 80MB to 120MB hard disk, one parallel and one serial port, VGA controller and color monitor, 101-key keyboard, mouse, and DOS 3.3 or later version.
[2] Extra-cost option.
[3] Vendor does not sell through dealers.
[4] Switchable setting.

WHERE TO BUY

Acer
401 Charcot Ave.
San Jose, CA 95131
408/922-0333,
408/922-0175 (fax)

Advanced Logic Research
9401 Jeronimo
Irvine, CA 92714
800/444-4257,
714/581-9240 (fax)

AEG Olympia
3140 Rt. 22W, Box 22
Somerville, NJ
08876-0022
908/231-8172,
908/231-8457

Arche Technologies
48881 Kato Rd.
Fremont, CA 94539
800/422-4674,
415/623-8171 (fax)

AST Research Inc.
16215 Alton Pkwy.
P.O. Box 19658
Irvine, CA
92713-9658
800/876-4278,
714/727-9355 (fax)

Austin Computer
10300 Metric Blvd.
Austin, TX 78578
800/752-1577,
512/454-1357 (fax)

Blackship Computer Systems, Inc.
4031 Clipper Ct.
Fremont, CA 94538
800/877-6249,
415/770-8674 (fax)

Boss Technology
6050 McDonough Dr.
Norcross, GA 30093

			DESIGN					SERVICE AND SUPPORT							
Built-in floppy controller	Built-in VGA controller	Intel 80287 support	Switchless setup	Tilt-and-swivel monitor	Front-panel on/off	Front-panel reset	Compact footprint (16 by 16 inches)	Warranty (months)	Free on-site service (months)	Toll-free technical support	Daily support (hours)	Weekend support	Technical support BBS/fax	Vendor requires dealer training	Reader service number
Y	N	N	Y	Y[2]	Y	Y	Y	24	0	N	11	N	Y/Y	Y	710
Y	Y	N	Y	Y[2]	Y	Y	Y	24	0	Y	11	N	Y/Y	Y	710
Y	N	N	Y[2]	Y	N	N	Y	12	0	N	9	N	Y/Y	Y	711
Y	N	Y	Y	Y	Y	N	N	12	9	N	9	N	Y/Y	N	711
Y	Y	Y	Y	Y	Y	Y	Y	12	0	N	9	N	N/Y	N	712
Y	N	Y	Y	Y[2]	N	Y	Y	24	24	Y	10	N	Y/N	Y	713
Y	Y	Y	Y	Y	N	Y	Y	12	12	Y	9	N	N/Y	[3]	714
Y	Y	Y	Y	Y	Y	Y	Y	12	12	Y	9	N	N/Y	N	715
Y	N	Y	N	Y	N	N	Y[2]	12	12	Y	11	Y	N/Y	N	716
Y	Y	Y	Y	Y	Y	N	Y	12	12	Y	15	Y	Y/Y	[3]	717
N	N	Y	Y	Y	Y	Y	Y	12	12	N	9.5	N	N/Y	[3]	718
N	N	Y	N	Y	Y	Y	Y	12	12	Y	9.5	N	N/Y	N	719
Y	Y	Y	Y	Y	Y	Y	N	12	0	N	9	N	Y/N	Y	720
Y	Y	Y	Y	Y	N	N	N	12	12	Y	11	Y	Y/Y	N	721
N	N	Y	Y	Y	Y	Y	Y	12	0	Y	8	N	N/N	N	722
N	N	Y	Y	N	N	Y	Y	12	3	N	11	N	Y/Y	Y	723
Y	N	Y	Y	N	Y	N	Y	12	3	N	11	N	Y/Y	Y	723
N	N	N	N	Y	Y	Y	Y	12	12	Y	8	Y	N/Y	[3]	724
Y	Y	Y	Y	Y	Y	Y	Y	12	0	N	9	N	N/Y	N	725
N	N	Y	Y	Y	N	N	N	12	12	Y	9.5	N	N/Y	[3]	726
Y	Y	N	Y	Y	Y	Y	Y	12	0	Y	11	Y	Y/Y	N	727
Y	Y	Y	Y	Y	Y	Y	Y	12	0	Y	8	N	N/Y	N	728
Y	Y	Y	Y	Y	Y	Y	Y	12	0	N	8	Y	N/Y	N	729
Y	Y	Y	Y	Y	Y	Y	Y	12	0	Y	9.5	Y	N/Y	N	730
Y	Y	Y	Y	Y	Y	N	Y	12	12	N	[5]	[5]	[5]	Y	731
Y	Y	Y	Y	Y[2]	Y	Y	Y	12	0	Y	11.5	N	N/N	Y	732
Y	Y	Y	Y	Y	Y	Y	Y	12	0	Y	10	Y	Y/Y	[3]	733
N	N	Y	Y	Y	Y	Y	Y	12/60[6]	12	Y	10	Y	Y/N	[3]	734
Y	Y	Y[2]	Y	Y	Y	Y	Y	24	24	Y	24	Y	Y/Y	N	735
Y	N	N	Y	Y	Y	Y	Y	36	12	Y	10	N	N/Y	N	736
N	N	Y	Y	Y	Y	Y	Y	24	0	Y	8	Y	N/Y	[3]	737
Y	Y	N	Y	Y	N	N	N	12	0	N	6	N	N/Y	N	738
Y	Y	Y	Y	Y	N	Y	Y	12	4	Y	10	N	Y/Y	Y	739
Y	N	Y	Y	Y	N	Y	Y	12	4	Y	10	N	Y/Y	Y	739
Y	Y	Y	Y	Y	N	Y	Y	12	0	N	9	N	N/Y	N	740
Y	Y	Y	Y	Y	N	Y	Y	12	0	N	9	N	N/Y	N	740
Y	Y	Y	Y	Y	Y	Y	Y	12	12	Y	12	N	Y/Y	N	741
Y	Y	Y	Y	Y	Y	Y	Y	12	12	Y	12	N	Y/Y	N	741
N	N	Y	N	Y	N	Y	Y	12	12	Y	9	N	N/N	[3]	742
Y	N	Y	Y	Y	Y	Y	Y	12	0	Y	24	Y	Y/Y	Y	743

[5] Varies from dealer to dealer.
[6] 12 months parts/60 months labor.

For more information about all products in this table, circle reader service no. 907.

800/628-1787,
404/368-2077

CSS Laboratories
1641 McGaw Ave.
Irvine, CA 92714
800/966-2771,
714/852-0410 (fax)

C2
47448 Fremont Blvd.
Fremont, CA 94538
415/683-8888,
415/683-8893 (fax)

DataWorld
3733 San Gabriel
River Pkwy.
Pico Rivera, CA
90660-1495
800/736-8080,
213/695-3777

Dell Computer Corp.
9505 Arboretum Blvd.
Austin, TX
78759-7299
800/426-5150,
512/338-8700 (fax)

DFI
2544 Port St.
West Sacramento, CA
95691
916/373-1234,
916/373-0221 (fax)

Eltech Research Corp.
47266 Benicia St.
Fremont, CA 94538
800/234-4331,
415/438-0663
(continues)

16-MHz 286 COMPUTERS

Manufacturer	Model	Price[1]	STANDARD FEATURES: CPU speed (MHz)	Fast-RAM capacity (MB)	8/16-bit slots	8-bit slots	Max. number of third-/half-/full-height drives	Externally accessible bays	Largest hard disk sold with machine	Parallel ports	Serial ports	Dedicated mouse port
ACER	915V(II)	$1499	16	5	4	0	0/4/0	2	100MB	1	2	Y
AST RESEARCH	Bravo 286/16	$2489	16	16	5	0	0/4/0	2	40MB	1	2	Y
AUSTIN COMPUTER	Austin 286/16	$2165	8/16[3]	8	6	1	0/4/0	3	330MB	2	3	N
BLACKSHIP COMPUTER	BLK286/16	$1495	16	4	6	2	2/4/0	3	200MB	1	2	N
CSS LABORATORIES	Preferred 286-16	$1736	16	2	7	1	0/2/2	3	1.2GB	1	2	N
C2	Warrior 16/S	$1900	16	5	5	1	1/1/1	3	200MB	1	2	N
DFI	DFI 286/16	$2049	16	4	5	3	4/3/0	3	340MB	1	2	N
ELTECH RESEARCH	1100S	$1899	16	8	6	2	1/3/0	3	200MB	1	2	N
EVEREX	Tempo 286/16	$2099	16	4	6	2	0/3/0	2	200MB	1	2	N
	Step 286/16	$2842	16	4	6	2	0/3/0	2	200MB	1	2	N
FLYTECH TECHNOLOGY	FT 9250 Series	$2379	16	4	0	1	0/2/0	1	80MB	1	2	N
GATEWAY 2000	286-16 MHZ	$1495	16	16	5	0	0/3/0	2	200MB	1	2	Y
INSIGHT	Insight 286	$1595	16	4	6	2	1/4/0	5	340MB	2	2	N
MAGITRONIC TECHNOLOGY	M-216-40	$1695	16	4	5	2	0/3/1	4	130MB	1	2	N
MICRO EXPRESS	ME 286/16	$1499	16	8	6	2	2/3/0	4	700MB	1	2	N
MICRO SMART	Smart Micro 286 Plus	$1830	16	16	6	2	0/0/4	3	1.2GB	1	2	N
MITSUBA	Mitsuba 286-16	$2195	16	5	5	3	0/4/0	3	210MB	1	2	N
MULTIMICRO	MMI 286-16	$1992	16	4	6	2	1/3/0	1	1.2GB	1	2	N
OLIVETTI OFFICE USA	M290S	$4159	16	5	3	0	2/1/0	2	100MB	1	1	Y
OSICOM	Executive SL 286/16	$2699	16	4	5	0	0/3/0	2	210MB	1	2	Y
PC AMERICA	GEM 286t	$2177	16	4	5	2	0/5/0	3	1.2GB	1	2	N
PC BRAND	286/16 ISA	$1996	16	8	6	1	0/6/0	4	660MB	1	2	N
PC HOUSE	Data 80	$1240	16	5	6	2	3/1/0	1	180MB	1	2	N
POLYWELL COMPUTERS	Poly 286-16S	$1500	16	8	5	2	2/3/0	5	200MB	2	2	N
REPLY	286/16	$4890	16	8	5	0	2/2/1	3	400MB	2	2	Y
SWAN TECHNOLOGIES	286/16	$2119	16	8	6	1	0/4/0	3	200MB	2	1	N
SYSTEK	Systek-286/16	$1495	16	4	6	2	3/9/8	4	667MB	1	2	Y
TANDY	2500 XL/2	$3447	16	4	3	0	0/2/1	3	440MB	1	2	Y
TENEX	Tenex 286/16	$1779	16	5	2	3	0/3/0	2	200MB	1	2	N
UNITEK MICROSYSTEMS	Plamar 216	$1611	16	8	3	0	2/3/1	4	320MB	1	2	N
US INTEGRATED TECHNOLOGIES	Athena 286/16	$2749	16	4	3	0	0/3/0	2	200MB	1	2	Y
WANG	PC 250/16	$4490	16	8	4	1	0/3/0	2	100MB	1	2	N
WLT	AT216-6	$2316	16	8	5	1	0/4/0	2	100MB	1	2	N

[1] Price based on 4MB RAM, 1.2MB or 1.44MB floppy drive, 80MB to 120MB hard disk, one parallel and one serial port, VGA controller and color monitor, 101-key keyboard, mouse, and DOS 3.3 or later version.
[2] Extra-cost option.
[3] Switchable setting.
[4] Vendor does not sell through dealers.
[5] 12 months parts/60 months labor.

WHERE TO BUY

(continued)

Epson America
20770 Madrona Ave.
Torrance, CA 90503
213/782-0770

EPS Technologies, Inc.
10069 Dakota St.
Jefferson, SD 57038
800/447-0921,
605/966-5482 (fax)

ESC Computers, Inc.
7042 Owensmouth Ave.
Canoga Park, CA 91303
818/888-0188,
818/888-7090 (fax)

Everex
48431 Milmont Dr.
Fremont, CA 94538
415/498-1111,
415/683-2400 (fax)

FastMicro
3655 E. La Salle St.
Phoenix, AZ 85040
800/441-3278

Flytech Technology
3008 Scott Blvd.
Santa Clara, CA 95054
408/727-7373,
408727-7375 (fax)

Fortron
6818-G Patterson Pass Rd.
Livermore, CA 94550
415/373-1008,
415/373-1168 (fax)

Gateway 2000
610 Gateway Dr.
North Sioux City, SD 57049
800/523-2000,
605/232-2023 (fax)

HiQuality
740 N. Mary Ave.
Sunnyvale, CA 94086
408/245-5836,
408/245-3108

Insight
1912 W. Fourth St.
Tempe, AZ 85281
800/776-7600,
602/829-9193 (fax)

			DESIGN					SERVICE AND SUPPORT							
Built-in floppy controller	Built-in VGA controller	Intel 80287 support	Switchless setup	Tilt-and-swivel monitor	Front-panel on/off	Front-panel reset	Compact footprint (16 by 16 inches)	Warranty (months)	Free on-site service (months)	Toll-free technical support	Daily support (hours)	Weekend support	Technical support BBS/fax	Vendor requires dealer training	Reader service number
Y	Y	N	Y	Y[2]	Y	Y	Y	24	0	N	11	N	Y/Y	Y	675
Y	Y	Y	Y	Y	Y	Y	Y	12	0	Y	10	N	Y/Y	Y	676
Y	N	Y	N	Y	N	N	Y	12	12	Y	15	Y	Y/N	[4]	677
Y	Y	Y	Y	Y	N	Y	Y	12	12	Y	9	N	N/Y	[4]	678
Y[2]	N	Y	N	N	N	Y	N	18	12	Y	13	N	Y/Y	N	679
Y	N	Y	Y	Y	Y	Y	Y	12	12	Y	9	N	N/Y	N	680
N	N	Y	Y	Y	Y	Y	Y	12	12	N	9.5	N	Y/N	N	681
N	N	Y	N	Y	Y	Y	Y	12	12	Y	10.5	N	N/Y	N	682
N	N	Y	Y	N	N	Y	Y	12	3	N	11	N	Y/Y	N	683
N	N	Y	Y	N	N	Y	Y	12	12	N	11	N	Y/Y	N	683
Y	Y	Y	Y	Y	Y	Y	Y	12	0	N	9	N	N/Y	N	684
Y	Y	N	Y	Y	Y	Y	Y	12	12	Y	18	Y	Y/Y	[4]	685
N	N	N	Y	Y	N	Y	Y	12	0	Y	12	Y	N/Y	N	687
Y	Y	N	N	Y[2]	Y	Y	Y	12	0	Y	9	N	Y/Y	N	688
Y	Y	N	N	Y	Y	Y	Y	12	0	Y	11	N	N/Y	N	689
N	N	Y	Y	Y	Y	Y	Y	12	12	Y	9.5	Y	N/Y	N	690
Y	Y	N	N	Y	N	Y	Y	12	12	Y	9	N	N/Y	N	691
N	N	Y	Y	Y	N	Y	Y	12	12	N	9	N	Y/Y	N	692
Y	Y	Y	Y	Y	Y	N	Y	12	12	Y	8	N	N/Y	N	693
Y	N	N	N	Y	Y	Y	Y	12	12	Y	12	N	Y/Y	N	694
Y	Y	Y	Y	Y	Y	N	Y	12	12	Y	8	N	N/Y	N	693
Y	N	N	N	Y	Y	Y	Y	12	12	Y	12	N	Y/Y	N	694
N	N	Y	Y	Y	Y	Y	Y	12	0	N	10	Y	Y/Y	N	695
Y	N	Y	Y	Y	Y	Y	Y[2]	60	0	Y	11	N	Y/Y	[4]	696
Y	Y	N	Y	Y	Y	Y	Y	12	0	N	8.5	Y	N/Y	N	697
Y	N	Y	Y	Y	Y	Y	Y	12/60[5]	12	Y	10	Y	Y/Y	N	698
Y	Y	Y	Y	Y	Y	Y	Y	12	12	Y	11.5	N	Y/Y	[4]	699
Y	Y	Y	Y	Y	N	Y	N	24	24	Y	12	Y	Y/Y	[4]	700
N	N	Y	Y	Y	Y	Y	Y	12	12	Y	9	Y	N/Y	N	701
Y	Y	Y	Y	N	Y	Y	Y	12	0	N	9	N	Y/N	N	702
Y	Y	N	Y	N	Y	Y	Y	12	0	N	9	N	N/Y	N	703
Y	N	Y	Y	Y	Y	Y	Y	12	0	Y	9	N	N/N	N	704
Y	Y	Y	Y	Y	Y	Y	Y	12	0	N	10.5	N	Y/Y	N	705
Y	Y	Y	Y	Y	Y	Y	N	12	0	Y	19	N	Y/Y	[4]	706
Y	Y	Y	Y	Y	Y	Y	N	36	36	Y	12	N	N/Y	[4]	707

For more information about all products in this table, circle reader service no. 906.

Jade Computer
4901 W. Rosecrans
Hawthorne, CA 90251
800/421-5500,
213/675-2522 (fax)

Leading Spect
1049 Segovia Cir.
Placentia, CA 92670
800/234-0688,
714/666-2626

Magitronic Technology
10 Hub Dr.
Melville, NY 11747
516/454-8255,
516/454-8258 (fax)

Metra Information Systems
935 Benecia Ave.
Sunnyvale, CA
94086-0897
800/733-9188,
408/730-5933 (fax)

Micro Express
1801 Carnegie Ave.
Santa Ana, CA 92705
800/642-7621,
714/852-1225 (fax)

Micro Smart Inc.
200 Homer Ave.
Ashland, MA 01721
800/370-9090,
508/872-9090,
508/881-1520

Mitsuba Corp.
1925 Wright Ave.
Laverne, CA 91750
800/648-7822,
714/392-2000,
714/392-2021 (fax)

MultiMicro, Inc.
582 Folsom St.
San Francisco, CA
94105
800/848-4256
415/979-0140,
415/979-0142

NCR Corp.
1700 S. Patterson Blvd.
Dayton, OH 45479
513/445-5000,
513/445-2008 (fax)

NEC Technologies, Inc.
1414 Massachusetts Ave.
Boxborough, MA
01719
508/264-8000,
508/264-8673

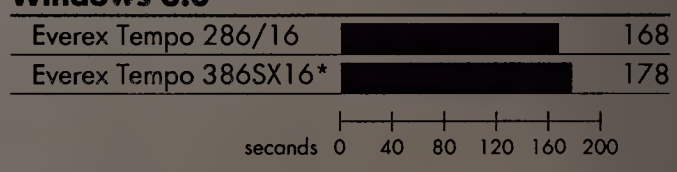
286—WINDOWS SPOKEN HERE

Michael Goodwin

Conventional wisdom holds that while a 286 system is fine for single-task DOS-based applications like word processors, you need a fast 386 for *Windows*. As a general rule, we agree—but there are exceptions, notably fast 16-MHz 286s, where low price and high performance come together.

PC World Test Center benchmarks show that *Windows* actually runs a hair faster on a 16-MHz 286 in standard mode than on a 16-MHz 386SX in enhanced mode. Of course, standard mode lacks a few *Windows* niceties, such as virtual memory and multitasking: You can't type a memo in *WordPerfect*, for instance, while *Quattro* is recalculating a worksheet in the background. But if you'll settle for *context switching* (flipping between applications without having to quit and save first), or if you want to run just one *Windows* application like *Excel*, a 286 may be your best deal. Of course, most DOS applications run a bit slower on a 286 than on a 386.

Most bargain hunters probably won't care, since these 286s average about $1500 less than comparable 16-MHz 386SXs.



*386 enhanced mode

Methodology
We tested the computers with 4MB RAM and 80MB hard disks. Timing begins and ends at the DOS prompt. We launch *Windows* along with a macro that loads *Excel* with a financial worksheet and initiates a recalc. Then the macro loads Lotus *Ami Pro* along with a 50K document that contains a 500K TIFF image. Finally, the macro launches *Micrografx Designer*, opens a drawing, displays it on screen, and exits to DOS.

Data based on tests designed and conducted by the PC World Test Center. All rights reserved.

WHERE TO BUY

(continued)

The Network Connection
1324 Union Hill Rd.
Alpharetta, GA 30201
800/327-4853,
404/751-1884 (fax)

Olivetti Office USA
765 U.S. Hwy. 202
Bridgewater, NJ 08807
908/526-8200,
908/526-8405 (fax)

Osicom
198 Green Pond Rd.
Rockaway, NJ 07866
201/586-2550,
201/586-9740 (fax)

PC America
3624 Pierce Rd.
Bakersfield, CA 93308
805/323-0707,
805/323-9747 (fax)

PC Brand
877 Supreme Dr.
Bensenville, IL 60106
800/722-7263
800/722-7392 (fax)

PC House
841 E. Artesia Blvd.
Carson, CA 90746
213/324-8621,
213/324-8654 (fax)

Polywell Computers
61-C Airport Blvd.
South San Francisco, CA 94080
800/999-1278,
415/583-7222,
415/583-1974 (fax)

Proteus Technology Corp.
377 Rt. 17 S.
Airport 17 Center
Hasbrouck Heights, NJ 07604
800/878-6427,
201/288-2245

Reply Corp.
4435 Fortran Dr.
San Jose, CA 95134
408/942-4804,
408/942-4897 (fax)

Sun Moon Star
1941 Ringwood Ave.
San Jose, CA 95134
800/545-4786,
408/452-1411 (fax)

Sunnytech, Inc.
17 Smith St.
Englewood, NJ 07631
800/367-1132,
201/569-6279 (fax)

Super Computer, Inc.
17910 S. Adria Maru Ln.
Carson, CA 90746
213/532-2133,
213/532-6342 (fax)

Swan Technologies
3075 Research Dr.
State College, PA 16801
800/468-9044,
814/237-5416

Systek
5310 W. 161 St.
Brook Park, OH 44142
216/676-6511,
216/676-6521 (fax)

Tandy Corp.
1800 One Tandy Center
Fort Worth, TX 76102
817/390-3011,
817/390-2774 (fax)

Tatung
2850 El Presidio St.
Long Beach, CA 90810
213/979-7055,
213/637-8484 (fax)

TeleVideo
550 E. Brokaw Rd.
San Jose, CA 95161-9048
800/835-3228,
408/954-0623 (fax)

Tenex
56800 Magnetic Dr.
Mishawaka, IN 46545-7481
800/776-6781,
219/255-1778 (fax)

Twinhead Corp.
1537 Centre Pointe Dr.
Milpitas, CA 95035
800/545-8946,
408/945-1080 (fax)

Ultra Comp
3801 Ultra Comp Dr.
Earth City, MO 63045
800/435-2266,
314/298-1998,
314/298-1288 (fax)

Unisys
P.O. Box 500
Blue Bell, PA 19424
215/986-2214,
215/986-2312 (fax)

Unitek Microsystems
7101 Adams #1
Willowbrook, IL 60521
800/535-7885,
708/323-3442 (fax)

US Integrated Technologies
3023 Research Dr.
Hilltop Industrial Park
Richmond, CA 94806
800/628-8312,
415/223-2766 (fax)

Wang
1005 Pawtucket Blvd.
Lowell, MA 01851
508/459-5000,
508/967-0401

WLT
1005 Pawtucket Blvd.
Lowell, MA 01854
800/272-9771,
508/937-7507,
508/656-8540 (fax)

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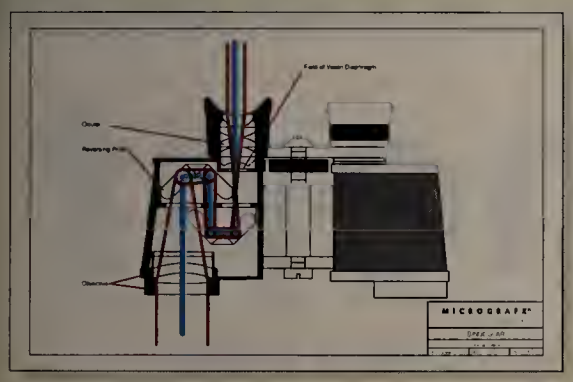

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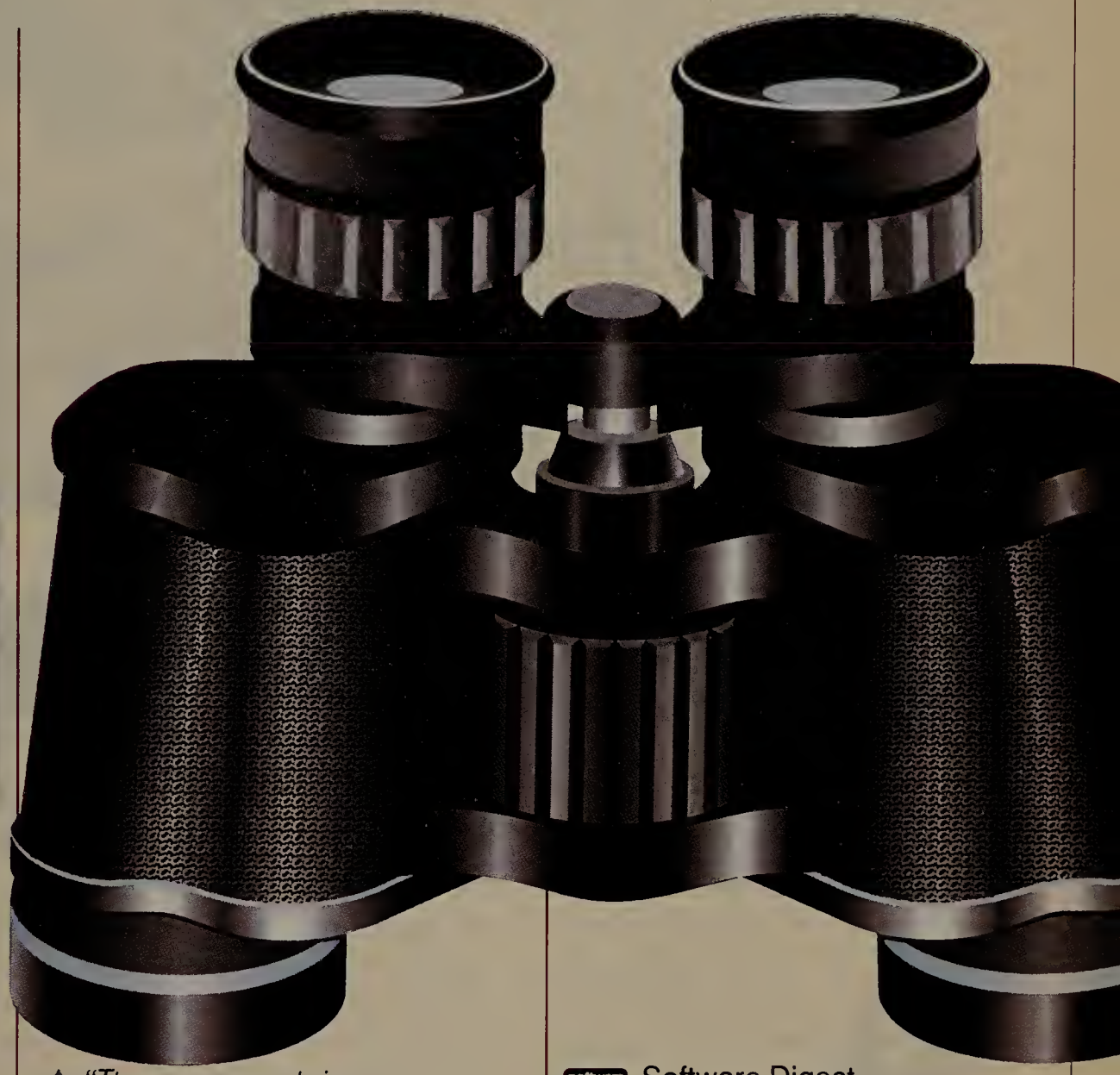

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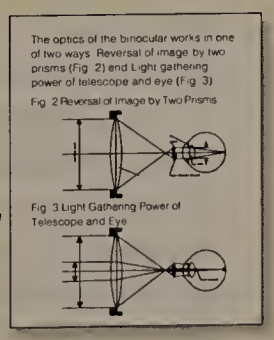
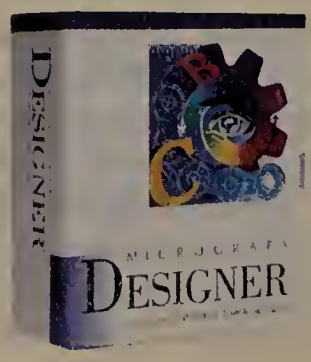
▶ *Desktop published articles become clearer with precision illustration from Designer 3.1. Multiple file formats speed up import and export of files.*



Outside perspective reflects well. "Designer is an outstanding illustration package that receives Editor's Choice recognition. Designer is perhaps the most sophisticated of all the illustration packages," writes *PC Magazine.*

Software Digest ★★★★★ Highest Rating! reports that "Designer provides the best overall graphics package. The program offers state-of-the-art features, good performance, and unmatched ease of learning and use in a sophisticated package. Designer can handle virtually any free-form graphics or design task with ease." Designer was awarded a top-of-the-class rating.



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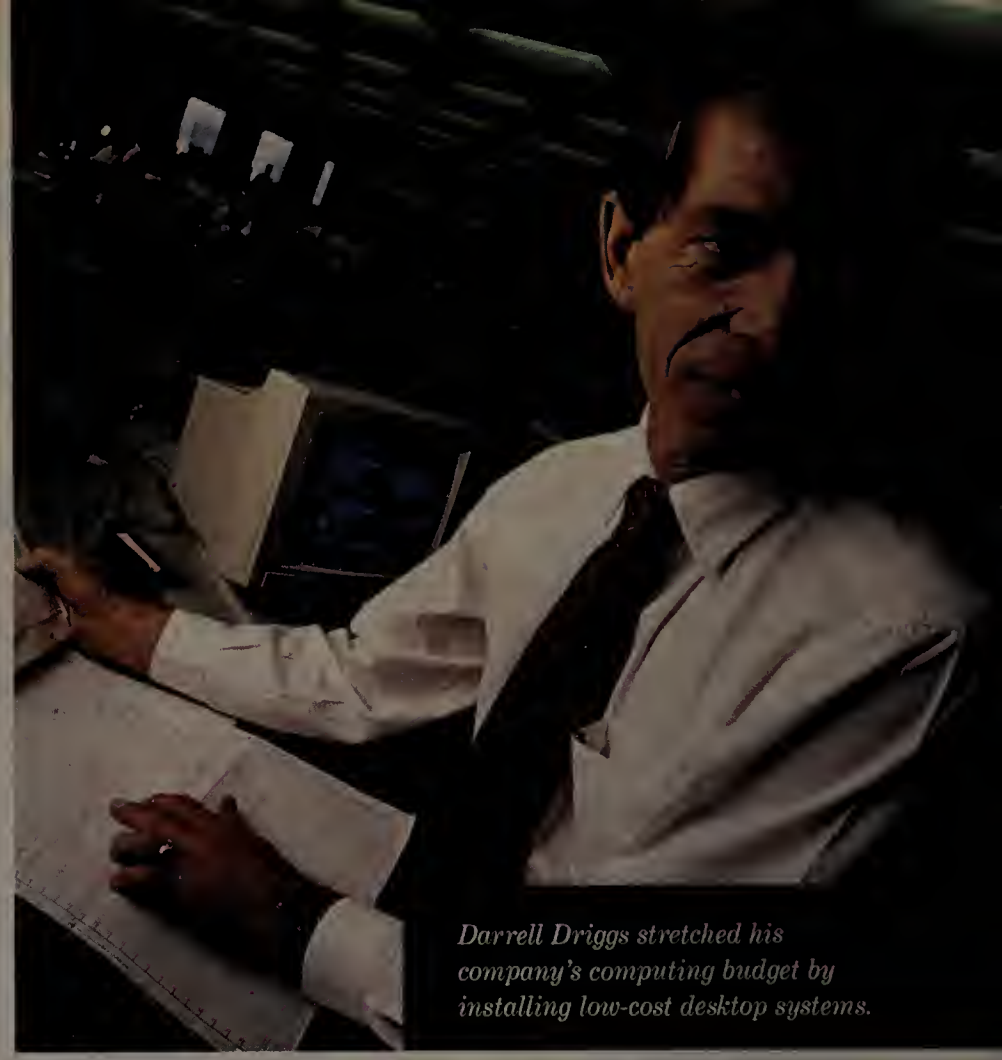
On Site: Making the Clone Commitment



Darrell Driggs stretched his company's computing budget by installing low-cost desktop systems.

Many companies want 386 power but can't afford name-brand prices. Shrewd investment in low-cost technology helped this lumber wholesaler double sales and revolutionize customer service.

David Raths

A few years ago, Darrell Driggs had a dream: to set up departmental LANs in all 11 divisions of North Pacific Lumber. The problem was, buying 300 brand-name desktop systems all at once was just too expensive. The solution? In a word, clones. Driggs, the company's data processing operations manager, decided to stray from IBM and buy 386-based PC-compatible systems from a local vendor. The decision has paid off in spades, saving the company more than $123,000—a savings the company invested in completing the installation of 11 interconnected departmental networks. Profits are up, customer turnaround time has been drastically reduced, and employee productivity has more than doubled.

Computers are critical to North Pacific's business for one reason—speed. The atmosphere in the company's Portland, Oregon, trading offices rivals that of Wall Street—frantic traders shouting prices into phones and to each other, buying lumber in all shapes and sizes to resell to customers around the world. "The lumber wholesale business is a competitive one," explains Phil Myers, vice president of the company's Pole and Piling Division. "The faster you can get an order confirmation out to a customer, the faster you can get to the next customer."

Before the advent of the LANs, traders wrote quotes by hand, typed order forms, and then rekeyed them into the company's mainframe-based accounting system—an arduous and repetitive process. They also spent hours looking up rail freight costs and schedules in big, unwieldy rate books.

In 1985, the company's data processing department developed a customized accounting program to run on a small network of 8088-based IBM PCs in a single division. Instead of taking several hours to handle a transaction, a few lucky traders could finalize a deal in a few minutes while the customer was still on the phone. But with a price tag of nearly $3500 each, the new PS/2 workstations that Driggs wanted were too pricey for North Pacific to purchase en masse for each of its 300 traders. That left most of the company still working the old-fashioned way.

STEVEN BLOCK

Slow Going

Gradually, Driggs was able to expand the company's PC collection. Because traders need all the desk space they can get, Driggs chose to purchase small IBM PS/2 Model 25s. Although the traders liked the systems' compact size, a problem surfaced: The machines didn't dissipate heat well. "It has been a headache," says Driggs. "The internal heat brings the unit down. Circuit boards have to be replaced." In one year alone, Driggs had to replace 7 out of 23 PS/2s.

In the meantime, the company's business was growing and changing. Traders needed to be able to run the company's custom applications—including accounting, inventory, and freight rate systems—along with off-the-shelf word processing and spreadsheet programs. "When customers call, traders need to be able to jump quickly between, say, the spreadsheets they're working on and an order form," Driggs explains. "The multitasking capabilities of a 386 allow them to do this."

Because of the problems with the PS/2 Model 25s and the desire to upgrade as many workstations as possible to multitasking 386s, Driggs decided to see if he couldn't get reliable products for much less than he'd have to pay IBM —or Compaq, for that matter.

"I felt that the newest 386 generation of clones was much closer in quality to the name-brand PCs than the 286 generation was," he recalls. "Novell had started authorizing many types of clones as nodes on their networks."

Network file servers, Driggs points out, are a different animal than single-user PCs; they require greater reliability and better performance. (North Pacific's older file servers are Compaq Deskpro 286s. Driggs is now buying ALR 25- and 33-MHz 386 machines to act as servers on newer networks.) Although Driggs was willing to take a bigger risk on the workstations to save money, they still had to meet the company's strict standards for compatibility and reliability.

Early attempts to locate a reliable vendor proved disappointing. Of three machines Driggs bought from one East Coast mail-order vendor, only one was configured correctly. "We couldn't get a response from the tech support staff," says Driggs, who has little patience with unresponsive suppliers. Another machine that failed North Pacific's network test was a "home-brew" computer built in the Portland area. Although Driggs describes the machine as "frighteningly cheap" (under $2000 for a full-bore 386 with VGA graphics), it was incompatible with the company's network standards.

Filling the Bill

After the failed experiments with mail-order and home-brew dealers, Driggs was still looking around. In April 1990, a salesperson from Bridgeway Computer in Portland brought him two Leading Technology 386SX units to evaluate. In spite of Leading Technology's national distribution, many would consider the Beaverton, Oregon–based company a third-tier clone manufacturer. But Driggs didn't mind "as long as the PCs worked."

First, the Leading Technology machines were put through a series of rigorous tests on the network. North Pacific systems/program supervisor John Deen, who helps Driggs evaluate machines, stresses the importance of testing PC compatibles in a real work environment, because "clones that work well in a stand-alone situation may have problems on a network." The Leading Technology machines passed the network test with flying colors.

The reliability of components was also a critical consideration. Driggs examined the parts carefully, believing that many clones contained parts that could become obsolete quickly. Leading Technology was appealing, says Driggs, because the manufacturer seemed to stick to familiar parts suppliers. The company uses the renowned Phoenix BIOS and a VGA board from Oak Technology, which manufactures them using an alternative to the Paradise chip set. "We'd had those boards in several different machines even before we started doing business with Leading Technology, and they'd always been quite reliable," Driggs says.

Local support was also important. Driggs believes the dealer responsible for tech support, Bridgeway, gets better response time from Leading Tech because it's also local. And, he adds, Bridgeway's role as a local vendor is crucial. "When you call a software publisher or a hardware manufacturer as an end user, you can spend a lot of time waiting on the line to get an answer to your question," he says, adding that it's better to be able to rely on your dealer for help.

After a 60-day evaluation period, Driggs was sold. "We paid the invoices, and since then we've purchased 35 more SXs."

Dealing With Support Issues

North Pacific's experience with the Leading Technology systems hasn't been perfect, according to Deen. "We've

PROBLEM:

- Inefficient manual systems
- Each trader needed a desktop computer
- Top-of-the-line PCs too costly

SOLUTION:

- Reliable low-cost 386 clone for each trader
- Interdepartmental LANs to improve communication

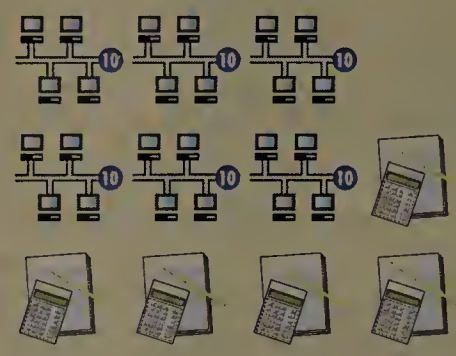
BENEFITS:

- Sales nearly doubled
- Traders respond quickly to fluctuating market
- Improved customer service

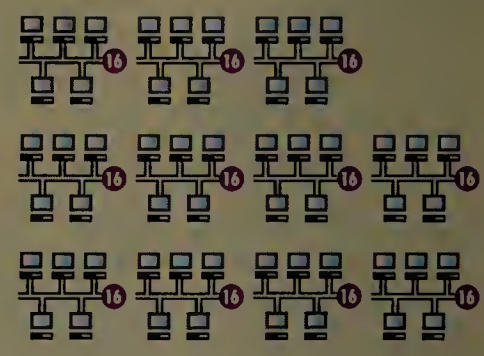
Building Low-Cost Networks

By purchasing new, low-cost 386SX clones for its traders and upgrading older computers for use as LAN file servers, North Pacific Lumber automated its 11 divisions twice as fast as it could have with name-brand PCs.

1985: The Beginnings of Automation
The first ten-node IBM PC–based network is installed in the Inland Species Division. Ten remaining divisions still use manual accounting, trading, and inventory systems.
Cost of the network: $38,607



1988: Halfway There
Additional networks are installed in six divisions. Four run on the older IBM PCs, and two use new IBM PS/2 Model 25s. Half the company's traders now work on line.
Cost per network: $25,826



1990: All Traders Automated
All 11 16-node networks are installed. Twenty-five new 386SX clones replace the PS/2 Model 25s, and the PS/2s replace the old PCs.
Cost per network: $17,750

had a few boot failure problems," he says. But because the Leading Technology machines come with a standard one-year warranty, boot failures don't upset Driggs too much. "As long as the machine is under warranty, I just ship it to the dealer and let them handle it."

What if one of the Leading Technology machines goes kaput after the warranty expires? It turns out Darrell Driggs is pretty handy with a screwdriver. If a machine has a minor problem, such as a bad power supply, he fixes it himself. However, he adds, "supplier support would definitely be more critical if I couldn't do repairs myself." He suggests companies without on-staff technical wizards or with machines whose warranty has expired should ask a dealer lots of questions: how quickly they can get a replacement model; whether the dealer does repairs in-house or ships them out to third parties; and what the per-hour charge is for repairs. "Getting a third-party company to do your maintenance is also a good idea," he notes.

Boosts in Profits, Productivity

How much money did North Pacific save by going with the low-end 386SX clones instead of IBMs or Compaqs? From the price quotes he got, Driggs figures 386s from Compaq or IBM would have cost the company $3000 apiece. The 386SXs cost $1400 each. "The savings are better than 50 percent. I get two for one."

That savings allowed North Pacific to complete installation of NetWare networks in the few remaining divisions that weren't automated. For example, automating the Pole and Piling Division network—including an upgrade to a Compaq 286 server, ten 386SX machines, network boards, software, and installation—cost a mere $17,750.

All this automation has boosted both productivity and profits, says Kurt Hutton, vice president and business manager for the Shelter Products Division. "Our traders' productivity has doubled since we set up these systems," he notes. "The traders in our division have jumped from average annual sales of $2 million per trader to $3.7 million per trader." In addition, job satisfaction and job knowledge on the part of traders and their assistants has "gone through the roof."

Traders are also able to provide much better customer service. They can access the inventory, order entry, bookings, and freight rate systems over the network. As a result, they can respond quickly to fluctuating market conditions, "bundle" shipments with other traders to achieve a low price for their customers, and keep track of inventory and orders. Eventually, an image processing capability will allow traders to scan in order forms from customers and attach the electronic forms to their own word processing or spreadsheet files, which will eliminate a heavy burden of paperwork.

Vice President Myers is also glad Driggs did some comparison shopping. "We wanted to go with the best and the latest. Darrell convinced me that these 386s will be the right machines for at least the next four or five years." And, Myers adds, the value of the computers has proved immeasurable. "We can have a purchase order to a customer in 5 minutes that used to take two weeks," he says. "It's amazing."

David Raths is a freelance writer in Portland, Oregon.

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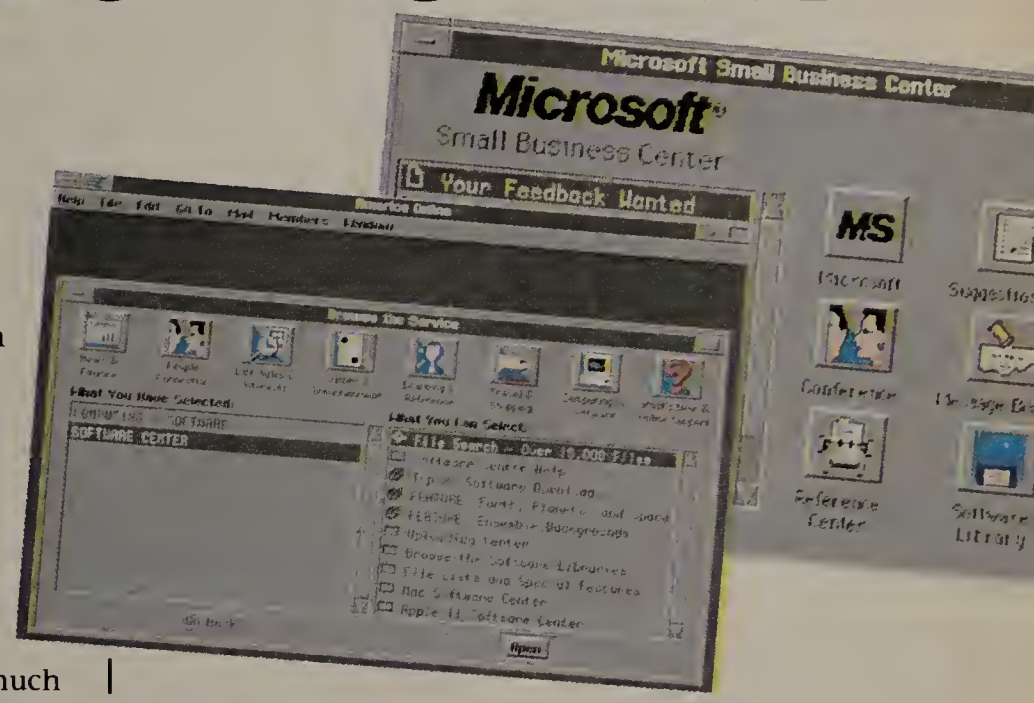

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PC Buyers Say Yes to Clones

Price-conscious PC buyers have turned to clones, and few regret the choice.

Roberta Furger

The word is out.

Clones are no longer the risky proposition they were a few years ago. Now organizations of all sizes are opting to buy from the so-called second-tier vendors.

The competitive pricing offered by companies such as AST, Dell, Everex, and Gateway 2000 is what makes most PC buyers turn to clones in the first place, according to a *PC World* satisfaction survey of 250 recent PC purchasers; value and price topped their list of priorities when buying PC compatibles.

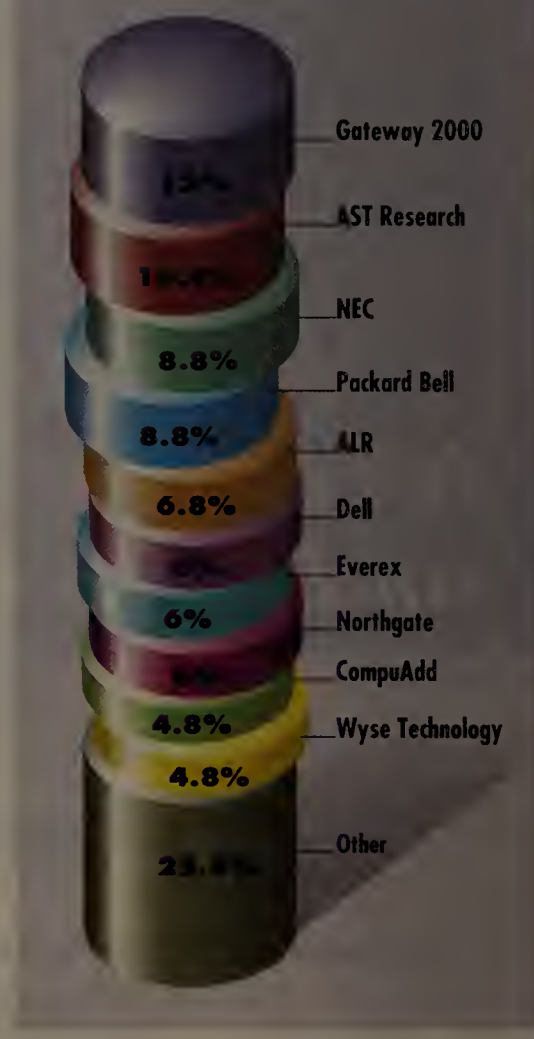
Relative newcomer Gateway 2000 boasts the largest installed base of any single vendor among our respondents. No one PC maker, though, claims a commanding lead in this area, with surveyed buyers having purchased PCs from 31 different companies (we present information here on the top ten).

Respondents reported purchasing everything from XTs to full-blown 486s, with the majority (59 percent) buying 386-based systems. Satisfaction is consistently high among those surveyed, regardless of the manufacturer or the class of system purchased.

Although most manufacturers received high ratings in user satisfaction,

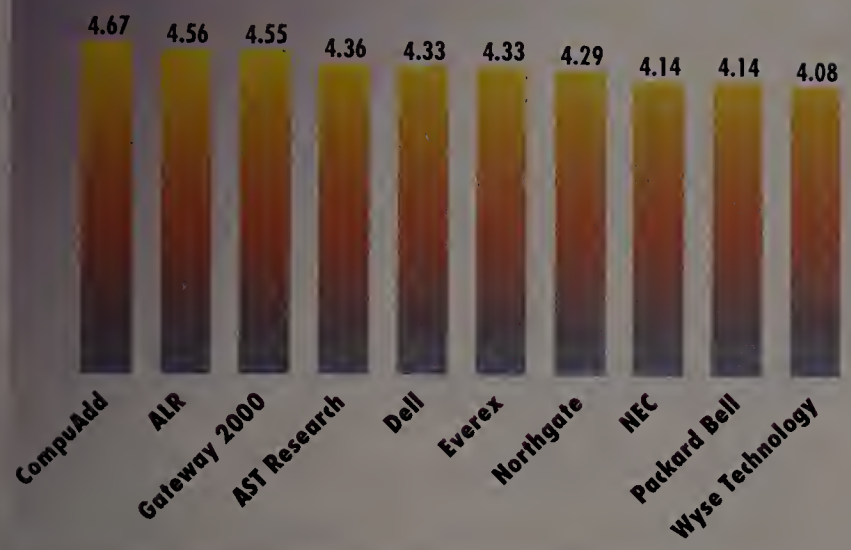
CLONE MAKERS BATTLE IT OUT

No manufacturer can claim a commanding lead among the installed base of IBM compatibles.



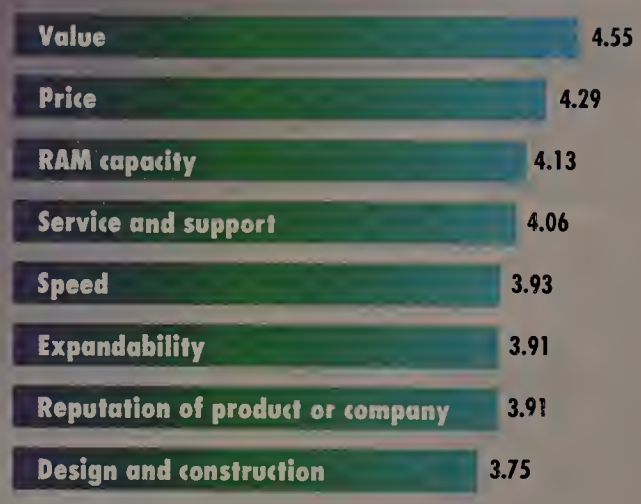
SATISFACTION LEVEL HIGH AMONG CLONE BUYERS

Overall satisfaction with product
1=low 5=high



VALUE, PRICE MOST CRITICAL BUYING ISSUES

Users rank important buying criteria
1=low 5=high



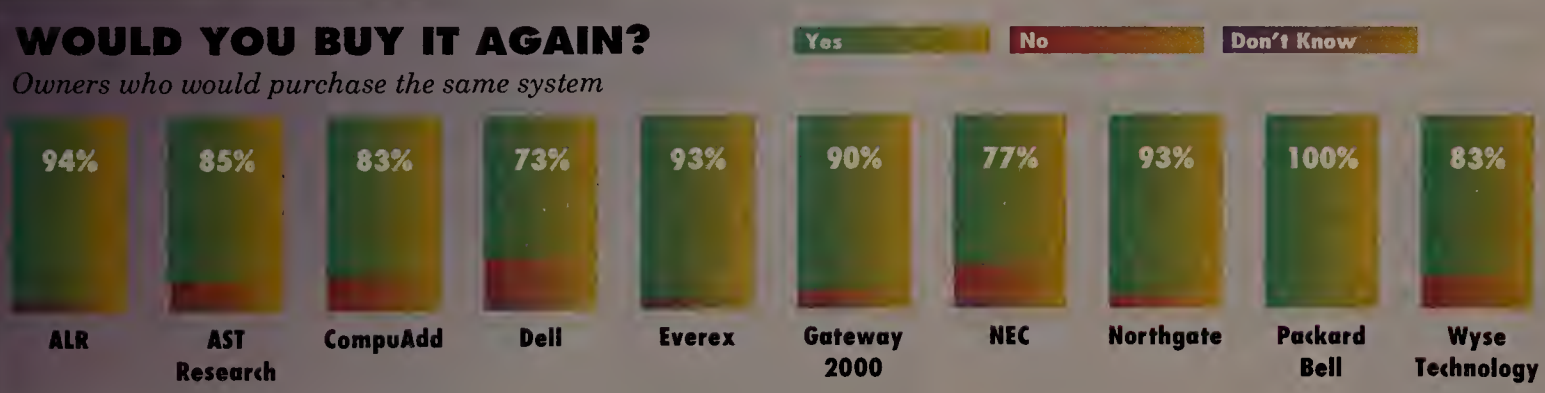
EXPANDABILITY, RAM CAPACITY EARN HIGH SATISFACTION RATINGS

1=low 5=high

	Overall	ALR	AST Research	CompuAdd	Dell	Everex	Gateway 2000	NEC	Northgate	Packard Bell	Wyse Technology
Value	**4.37**	4.38	4.16	4.67	4.43	4.27	4.59	4.11	4.36	4.38	4.20
Expandability	**4.36**	4.67	4.47	4.64	4.23	4.43	4.50	3.95	4.29	4.17	4.30
RAM capacity	**4.35**	4.69	4.17	4.55	4.31	4.43	4.54	4.21	4.43	4.05	4.27
Reputation of product or company	**4.29**	4.25	4.35	4.60	4.50	4.21	4.59	4.35	4.31	3.94	3.11
Design and construction	**4.24**	4.36	4.45	4.45	4.33	3.93	4.23	4.15	4.46	4.07	4.18
Price	**4.22**	4.13	4.00	4.25	3.86	4.33	4.66	4.10	4.14	4.15	3.78
Service and support	**4.08**	4.00	3.89	4.67	4.25	4.00	4.38	4.07	4.29	3.58	3.57
Speed	**4.00**	4.56	4.54	4.50	4.43	4.60	4.59	3.74	4.54	4.32	4.20

WOULD YOU BUY IT AGAIN?

Owners who would purchase the same system



a surprisingly large number of respondents said they wouldn't choose the same system again. Twenty percent of those who bought a system from Dell said they wouldn't purchase the same product. Eighteen percent of the NEC buyers thought better of their decision, as did 17 percent of the purchasers of CompuAdd and Wyse PCs. In contrast, all the respondents who purchased a Packard Bell system said they would buy the same product again.

Roberta Furger is an associate editor for PC World.

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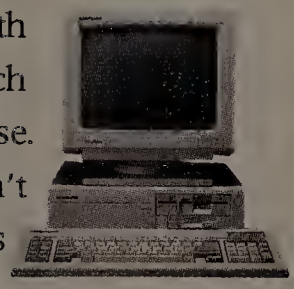

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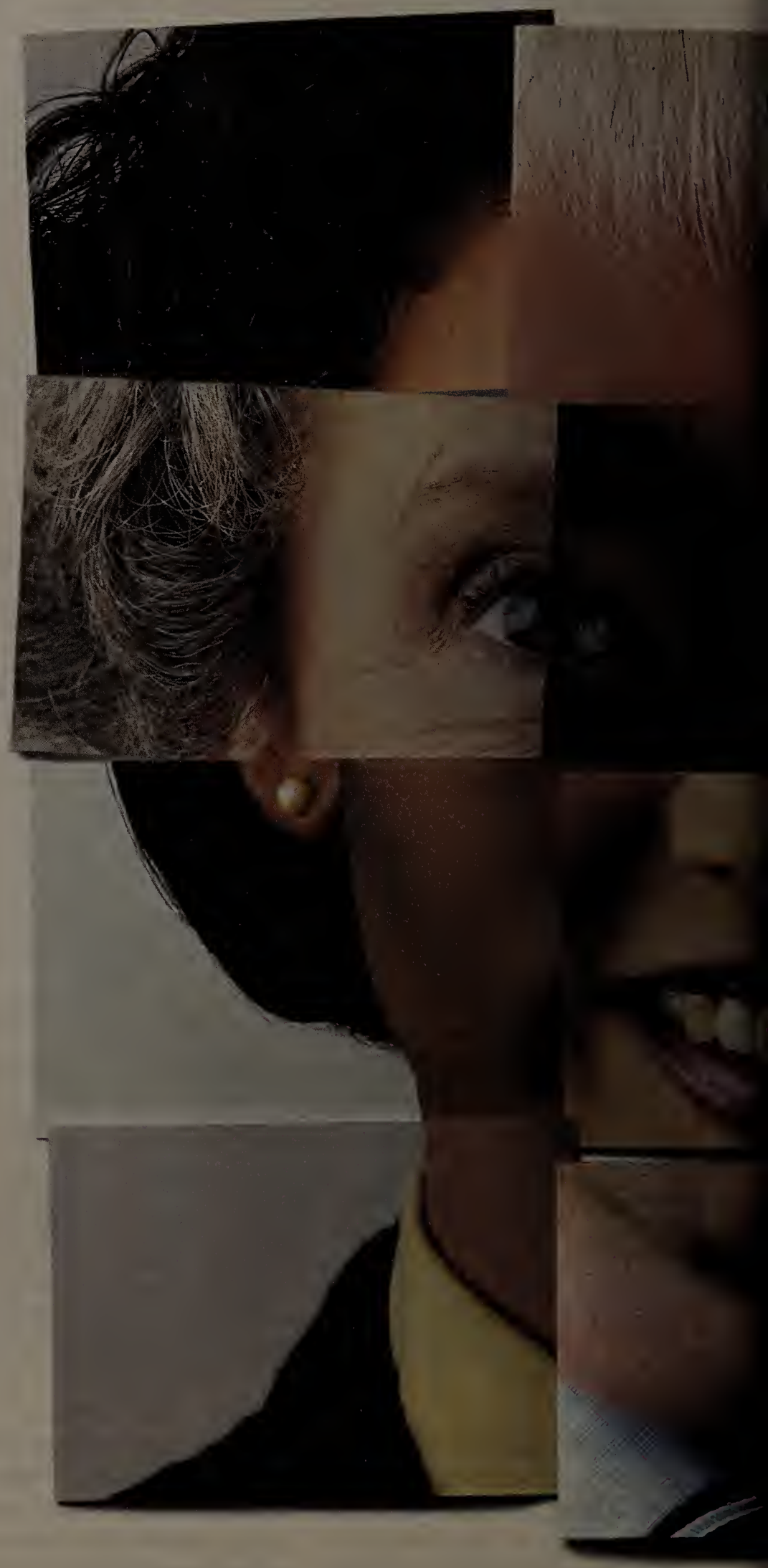

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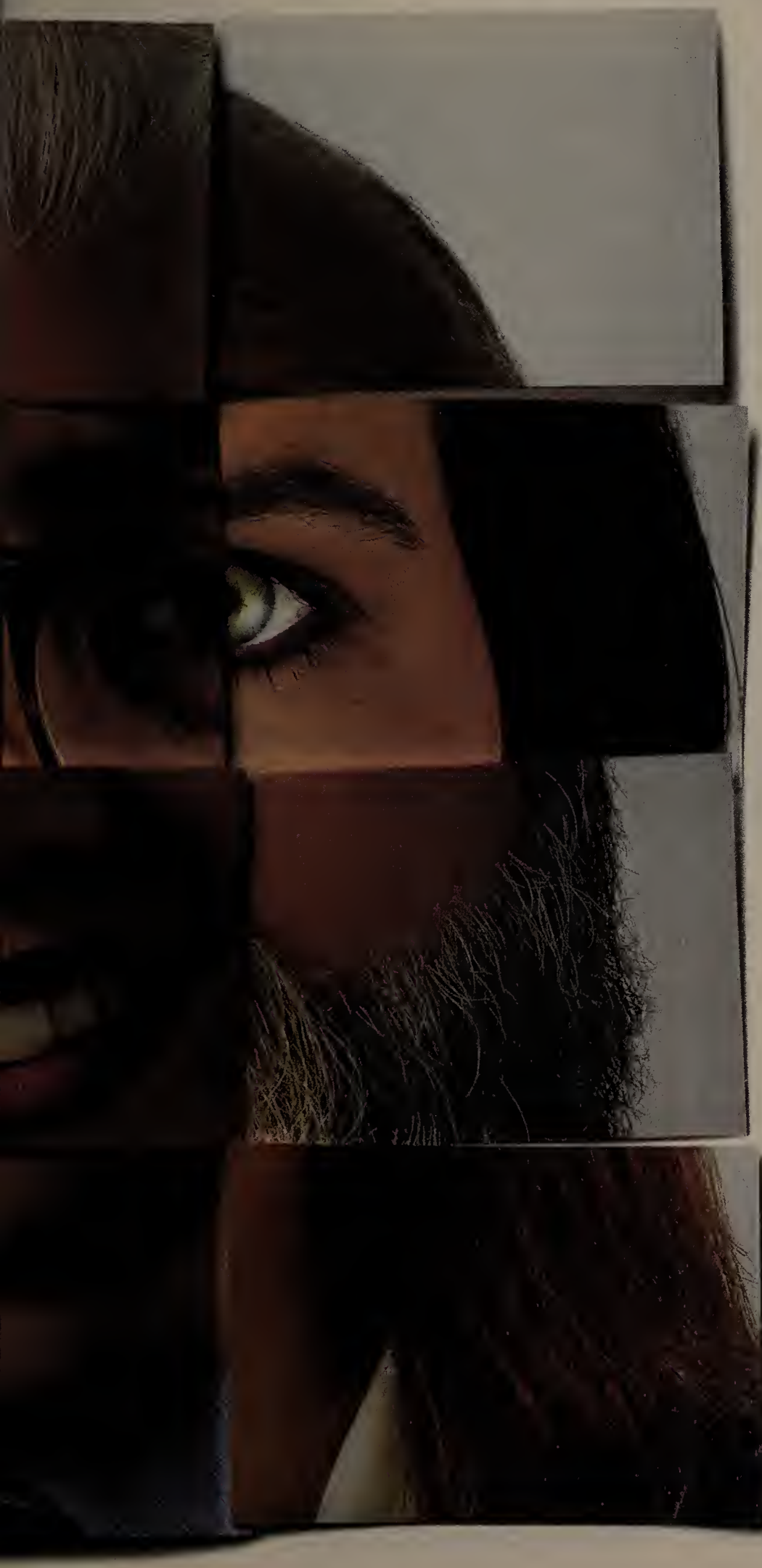

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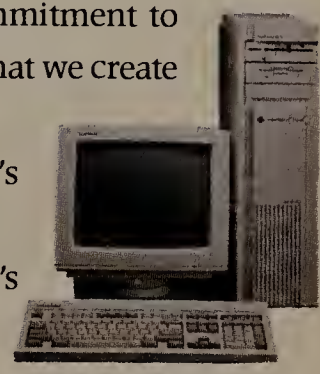

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	386S/20	*2 to 32MB*	*3 slots, 3 bays*	*100W*
PowerMaster	*386/25*	*4 to 8MB*	*8 slots, 5 bays*	*250W*
	386/33	*4 to 32MB*	*4 slots, 4 bays*	*200W*
SystemMaster	*386/33T*	*4 to 24MB*	*8 slots, 7 bays*	*270W*
	486/25TE	*4 to 32MB*	*8 slots, 7 bays*	*300W peak*
	486/33TE	*4 to 32MB*	*8 slots, 7 bays*	*300W peak*
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Special Report

Windows

A PC World Supplement on Windowing Environments and Applications

Design by Timm Sinclair / Illustrations created by Bud Peen with Corel Draw under Windows 3.0

EDITED BY ANITA AMIRREZVANI

Feature

New Windows on Corporate Data

Managers who don't speak mainframe are using Windows to painlessly access and input company data all across the LAN.

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Q+E

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Access SQL

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Road Test

Windows 3.0 users report from the trenches.

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Windows data access software gives you instant access to vital company data, no matter where it lies on the LAN.

New Windows on Corporate Data

Feature

Sharon Fisher

Like most companies across the country, Maritz Motivation Company in St. Louis wants to improve its managers' access to critical data. Maritz provides motivation, travel, communications, training, and research services to clients. Currently, several of Maritz's many field offices report their sales data every night to a VAX minicomputer located at the company's headquarters, where the data is then consolidated. But that wealth of information is difficult for top executives to access directly.

"Right now, the obstacles in getting to information mean that people are managing by the seat of their pants—by hunches and gut feel as opposed to facts," says John Roth, Maritz's manager of executive support systems. Roth is not alone in attempting to solve a problem that has plagued the business world for years: How do you provide employees with effortless access to valuable corporate data—data that is usually stored somewhere on an inhospitable minicomputer or mainframe?

In the past, employees had to rely on the corporate MIS department to retrieve the data they needed. Or they could use *terminal emulation* software, which enables PCs to act like IBM 3270 and DEC VAX terminals. But this software forces users to grapple with complicated emulation modes and mainframe application interfaces, and it requires expensive connectivity hardware.

At Maritz, a new executive information system due this fall will change all that. PCs will run an application developed with *SQLWindows,* a development tool from Gupta Technologies for creating graphical interfaces. The application will allow Maritz executives to use a *Windows* front end to query an *Oracle* data base on the VAX without having to jump through hoops. Instead of asking an analyst to research a question about sales prospects or forecasts, an executive will be able to click a button and access the information in an easy-to-understand format. "We're doing this to improve executives' access to timely information, which will help us sell more and sell better," says Roth.

Power to the Manager

New data access technologies are finally making the dream of enterprisewide access to information come true. Soon, it will be possible for managers to get all the critical data they need, whenever they need it—regardless of where that data is stored on the network. Data access tools are founded upon a "client-server" architecture, which separates processing functions from user interfaces. These tools tie together disparate users, applications, and systems with a common, comprehensible interface. By bringing critical data to managers and translating it into timely information they can use, these products can make a difference in the company's bottom line.

Not surprisingly, *Windows* is the favored environment for data access tools, chiefly because it's easy to work with. "People with *Windows* front ends can access inhospitable hosts and get to data that was traditionally kept from them," says Richard Holcomb, vice president of marketing for Pioneer Software, which sells the data access tool *Q+E* (see the review in this section).

Q+E and many products like it gather data from corporate data bases and present it on an easy-to-use front end. An executive can request data simply by pointing and clicking; the data access program translates the request into a standard data base query, often in Structured Query Language (SQL), the Esperanto of data base languages. The SQL command extracts the results from the SQL data base, which can reside on a mainframe, a mini, or a super-powerful, dedicated 386 or 486 PC. The data base, in turn, sends those results back to the executive's *Windows* application.

Besides ease of use, a key reason for the popularity of *Windows* as a home for data base front ends is its ability to create *hot links* between applications. With *Windows'* built-in Dynamic Data Exchange (DDE) capability, developers can set up links to transfer and update data automatically between, say, a SQL-capable *Windows* product and *Excel.* Managers can then see the numbers change in the spreadsheet in "real time" as the actual data changes.

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Windows data access and development tools cross a wide spectrum. Some, like *Forest & Trees*, are simply front ends aimed at executives who need to look at data in existing data bases. Others, like *Access SQL*, include a front end along with a data base server, allowing specified users to update data and developers to create forms-based applications for end users. Still others, like *Easel/Workbench*, are full-blown development tools for programmers, providing maximum control in creating front ends as well as in structuring a data base from the ground up.

Innovative Applications

At present, most organizations that are implementing *Windows*-based data access applications are still in the design stage. At the Rand Corporation in Santa Monica, California, programmers are working on an integrated modeling system for military clients that embraces PC applications such as *Excel*, *PowerPoint*, and *Word;* relational data bases on minicomputers and mainframes; and matrix computations written in C language that run on Sun workstations.

When completed, the application will allow users to model the future of the military's personnel, incorporating information such as what percentage are likely to be promoted or leave the service. "We have plans to reduce the size of the military force, and we need to figure out the effect of different policies," says Rand economist Jonathan Cave. With the application, Cave will be able to use *Excel* as a front end to access statistics stored in the relational data base on the server, such as personnel records and numbers of reenlistments. He can then pull the data together in an *Excel* spreadsheet.

Improving executives' access to information is the goal at the business systems consulting group of Arthur Andersen Company in Boston, where partner Mark Tino is designing applications that give executives timely access to their own company's data base, so they can get a clearer sense of the direction the business is taking. Once completed, the application will deliver data about such critical success factors as the quality of customer service or the profitability of certain divisions. It will also let executives use *Lightship*, a *Windows*–based management reporting system, to do what-if modeling and help them locate problem areas.

The main purpose of Tino's application will be to "help clients think through what business information is important and how to look at it." The beauty—and the difficulty—of the process is that it requires figuring out what crucial information is lacking. "When you get executives to rethink their needs, many of them realize that the information they really need isn't available. It doesn't exist because they've never asked the questions before," says Tino.

Grappling With Data Integrity

Naturally, data stored on a mainframe or a minicomputer is well protected partly because it's so difficult to reach. Granting easy to access to just about anyone, on the other hand,

Guide to Windows Data Access Tools

Here's a list of *Windows* data access products. The list includes easy-to-use front ends as well as application development tools directed at programmers. For information on *Forest & Trees*, *Q+E*, *Access SQL*, and *InfoAlliance*, see the reviews that follow in this section.

Choreographer

This graphical user interface development environment is used to create large-scale applications.

GUIdance Technologies
800 Viniol St.
Pittsburgh, PA 15212
412/231-1300,
412/231-2076 (fax)
LIST PRICE: $7500
Reader service no. 758

Easel/Workbench

Using this set of software development tools you can build graphical applications that run on *Windows*, OS/2, and DOS platforms.

Easel Corp.
25 Corporote Dr.
Burlington, MA 01803
617/221-2100,
617/221-3099 (fax)
LIST PRICE: $11,900
Reader service no. 759

Executive Query Tool

Access data from *SQL Server*, *Oracle*, DB2, and other data bases with this front end.

Telebit Corp.
1315 Chesapeake Terr.
Sunnyvale, CA 94089
408/734-4333,
408/734-3333 (fax)
LIST PRICE: $695
Reader service no. 760

Mezzanine

This network server progrom provides document management for network applications. Two third-party front ends are availoble: *reQuest* and *Viewz*.

Soros Corp.
10900 N.E. 8th St. #700
Bellevue, WA 98004
800/827-2767,
206/462-0879 (fax)
LIST PRICE: server version $2950; reQuest $495 per user; Viewz $345 per user
Reader service no. 761

Nevisys

Scheduled for release in August, this client-server authoring environment targets Fortune 500 companies that want PC-based occess to mainframe data.

Nevis Technologies
300 Corporote Pointe #440
Culver City, CA 90230
213/338-0257,
213/338-8563 (fax)
LIST PRICE: not available at press time
Reader service no. 762

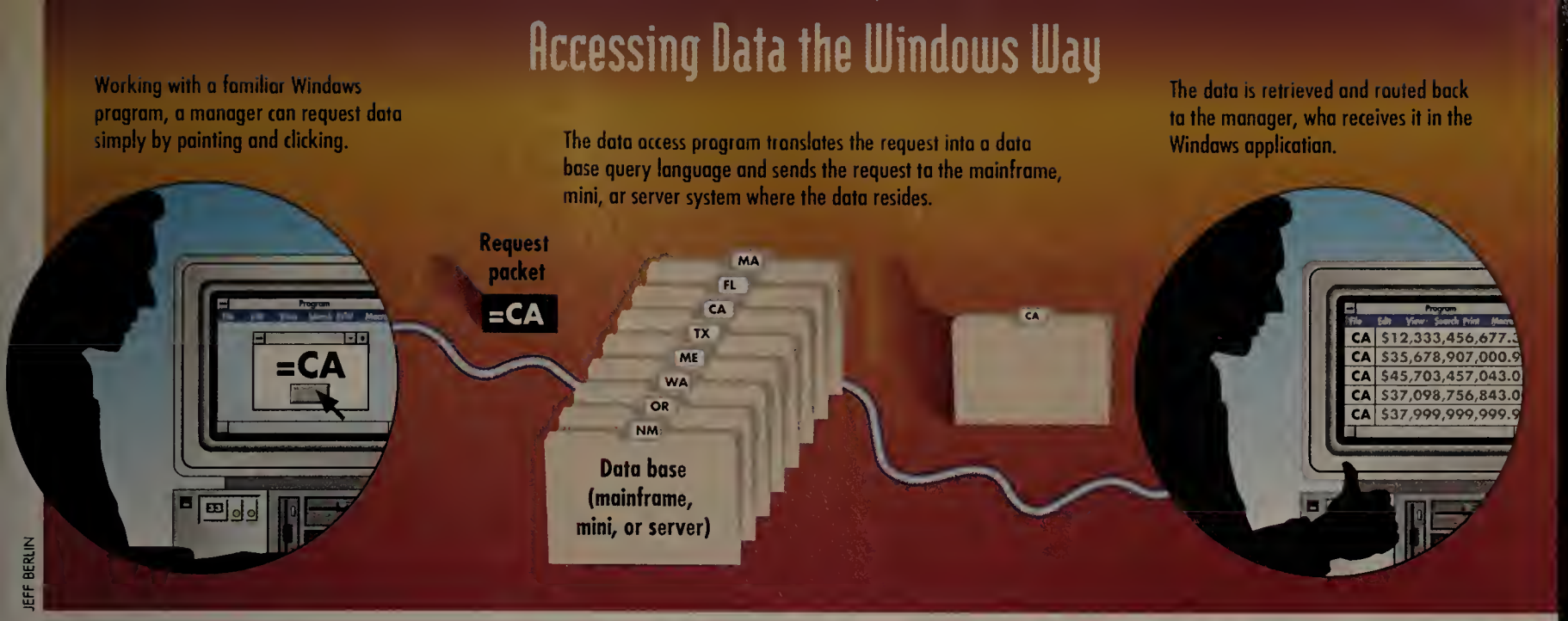
Object/1

This development environment creates graphical user interfoces for accessing dota from *SQL Server*, *mdbs4*, ond *IBM Doto Bose Monoger*.

Micro Data Base Systems, Inc.
Two Executive Dr.
P.O. Box 6089
Lafayette, IN 47903
317/447-1122,
317/448-6428 (fax)
LIST PRICE: $995
Reader service no. 763

ObjectView

Developers can build *Windows* applications for *SQL*



causes concern among MIS directors, who need to make sure that critical data remains both uncorrupted and secure.

Their concern stems from the update features of most data access tools, which allow users to make changes to live data on the server. Another potential source of worry is user access to sensitive or classified data. In order to deal with these questions, administrators must be very careful when deciding who is allowed to access or update certain kinds of data; these privileges can be controlled using the traditional methods of establishing data entry and data access rights for each user.

Many MIS directors are cautiously implementing pilot projects to test the limits of the new software, which is usually designed to make it easier for IS managers to set up multiple levels of security. Software Publishing's *InfoAlliance*, for example, provides built-in, mainframelike data integrity and security features that allow administrators to set up read-only views for some people, while providing others with both read and write privileges.

A Bright Future

Given the cost of redesigning corporate data systems, not to mention the "political" issues that often emerge in the who-owns-the-data struggle, it's going to be a while before systems that provide enterprisewide data access really take off. But in the long run, these systems have the potential to give managers new and ingenious ways of viewing and using their data. By turning hard-to-get-at data into viable information, data access products promise to change business computing dramatically for the better. Eventually, managers will be able to identify trouble spots, make more accurate projections, and solve problems more creatively—based on a better understanding of the inner workings of their business.

Server using icons, pull-down menus, and tables.

Matesys Corp.
900 Larkspur Landing Circle #175
Larkspur, CA 94939
415/925-2900,
415/925-2909 (fax)
LIST PRICE: $899
Reader service no. 764

Omnis 5

Developers can create graphical applications that support SQL and that are portable between PCs and Macs.

Blyth Software Inc.
1065 E. Hillsdale Blvd. #300
Foster City, CA 94404
415/571-0222,
415/571-1132 (fax)
LIST PRICE: $1000
Reader service no. 765

PC/SQL-Link Windows Requester

This front end can access data stored in a variety of relational data base formats, including *SQL Server* and DB2.

Micro Decisionware
2995 Wilderness Pl.
Boulder, CO 80301
303/443-2706,
303/443-2797 (fax)
LIST PRICE: $240–$720
Reader service no. 766

PowerBuilder

Build large-scale client-server applications with a graphical interface using this development tool.

Powersoft Corp.
70 Blanchard Rd.
Burlington, MA 01803
800/395-3525,
617/273-2540 (fax)
LIST PRICE: $2995
Reader service no. 767

SQL Commander for Windows

Provides data access in SQL data bases.

Datura Corp.
1926 E. Parham Rd.
Richmond, VA 23228
804/264-1225,
804/264-1297 (fax)
LIST PRICE: $195
Reader service no. 768

SQL Server Library

Using this *Windows Workstation* utility, you can run applications written for Gupta's *SQLWindows* with Microsoft's *SQL Server*.

Automated Design Systems
375 Northridge Rd. #270
Atlanta, GA 30350
800/366-2552,
404/394-2191 (fax)
LIST PRICE: five-user version of Windows Workstation $495; unlimited number of users $1995
Reader service no. 769

SQL SoftLink

Developers can connect *Windows* applications to *SQL Server* using DDE.

SQLSoft
10635 N.E. 38th Pl.
Bldg. 24, Suite B
Kirkland, WA 98033
206/822-1287,
206/822-1485 (fax)
LIST PRICE: five-user version $495
Reader service no. 770

SQLWindows

Developers can create graphical applications for SQL data bases. *Quest* is a new ad-hoc querying tool expected in June.

Gupta Technologies
1040 Marsh Rd.
Menlo Park, CA 94025
415/321-9500,
415/321-5471 (fax)
LIST PRICE: SQLWindows $1295; Quest $495
Reader service no. 771

Superbase 4

This relational data base and development system is used to create client-server applications.

Precision, Inc.
8404 Sterling St.
Irving, TX 75063
214/929-4888,
214/929-1655 (fax)
LIST PRICE: single-user version $695; five-user network extension $995
Reader service no. 772

For more information about all the products listed in this section, circle reader service no. 909.

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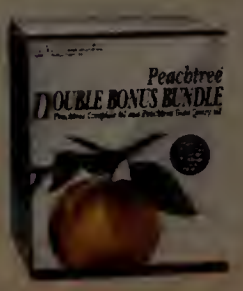

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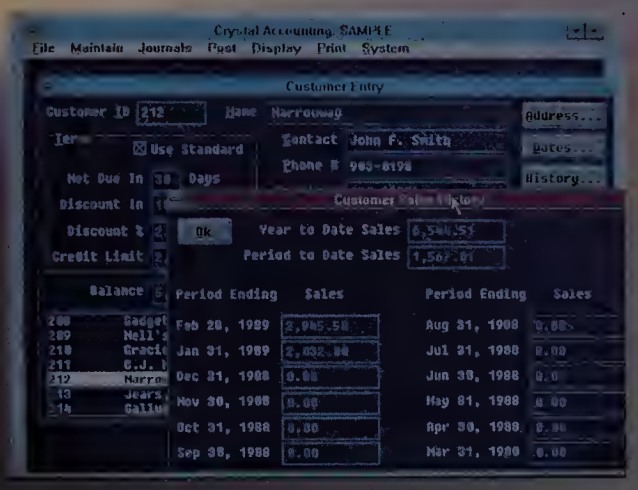

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Crystal Accounting is priced at $495, and when purchased from Peachtree Software, carries a 60-day money-back guarantee. A $25 restocking fee does apply to product returns.

Peachtree also stands behind its products with a toll-free number for telephone support. As a registered Peachtree user, you may receive support on a pay-per-call basis using a major credit card or prepaid through the PeachCare™ program. Although Crystal represents an entirely new type of accounting software, you can be comfortable with the fact it is published by Peachtree Software, the leading supplier of microcomputer accounting products.

System Requirements

Crystal Accounting requires at least an IBM AT or compatible with a hard drive; 640K of memory (1 Meg is highly recommended); an EGA, VGA or Hercules Graphics Card; DOS 3.1 or greater; and Windows 3.0 or greater. A mouse is highly recommended.

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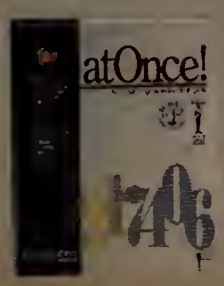

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PCW

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InfoAlliance

Data Access Software Preview

Robert M. Gentry
& Robert C. Bolt

Your wholesale auto parts operation seems to be held together with baling wire. You keep inventory data in SQL format in IBM OS/2 Extended Edition and your customer list in *dBASE*. To take an order, your salespeople have to print out the inventory data and then move to another PC to input part numbers and prices manually in an order form. To find out how forecasted inventory levels compare with actual inventory, you load *1-2-3* and then jot down the comparisons to input elsewhere. The result: slow and inaccurate data entry and reduced ability to track and analyze trends in your data.

Until *InfoAlliance* appeared, the only way to organize this crazy quilt was to start from scratch, painstakingly restructuring your data within a single data base. Now, with *InfoAlliance*, you can gather this data in the same custom-designed application and print out invoices, reports, and marketing letters. You don't even have to know where the data you want resides or what its file format is. You simply specify that you need the inventory file, and *InfoAlliance* delivers it to your screen.

Originally shipping late last year as an OS/2 Presentation Manager program, *InfoAlliance* will soon offer a *Windows* front end that can work with existing *Presentation Manager* front ends on a network. The *Windows* version will provide all the same features, including querying, reporting, and form creation tools, and an impressive application generator. The smooth windowing interface is also nearly identical, offering well-designed dialog boxes, pull-down menus, and icon shortcuts.

As with Xerox's *FormBase*, you use graphical on-screen forms to enter, query, and view data. When you're ready to analyze the data, you can create simple, predefined columnar reports or design elaborate form-based reports—and even use bit-mapped graphics (a company logo, for example).

An updated version of the core product, due out in late August with the *Windows* front end, will support Dynamic Data Exchange (DDE) and Microsoft's *SQL Server*, for improved data sharing with other *Windows* applications. Currently *InfoAlliance* can draw upon *dBASE*, *1-2-3*, IBM OS/2 Extended Edition Database Manager, and native *InfoAlliance* data.

Keep in mind that *InfoAlliance* is a major department or company investment. The price is likely to be steep (the previous Presentation Manager version cost $8500 for 10 users), and you'll probably need a part- or full-time administrator. But it's one of the few programs that can make sense of information scattered throughout different data bases.

SNAPSHOT

InfoAlliance for Windows 1.1

A client-server data manager that lets users query and integrate SQL, dBASE, and *1-2-3* data, the latest version of *InfoAlliance* offers a slick, farm-based *Windows* front end.

KEY FEATURES

- **Front end to dBASE, 1-2-3, and IBM OS/2 Extended Edition Database Manager data**
- **Complete form design and querying**
- **Report writer and application generator**

AVAILABILITY

Late August

PRICING

Unavailable at press time

Software Publishing Corp.
1901 Landings Dr.
Mauntain View, CA 94043-7210
415/962-8910

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InfoAlliance for Windows lets you use the common business form as your window on a wealth of information drawn from different dBASE, 1-2-3, and SQL data sources.

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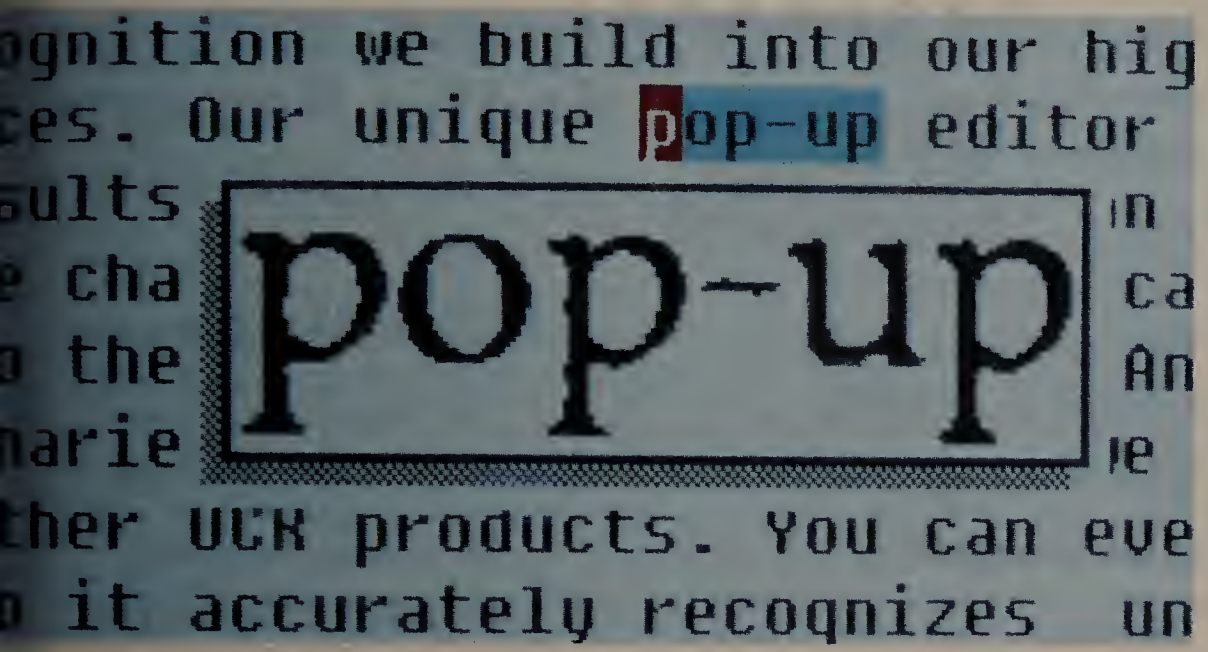

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Pageant

Opera
Poster

Financial
Financial Oblique
Financial Bold
Financial Bold Obl.

Journal
Journal Oblique
Journal Bold
Journal Bold Obl.

Gourmand
Gourmand Italic
Gourmand Bold
Gourmand Bold Italic

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Sunset Pattern
Radial Pattern
wood pattern
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— Outlines —

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Thick outline
Calligraphy Outline
Contour Outline

— Shadows —

3D Shadows
Drop Shadows

— Reverse —

ABCDabcd
ABCDabcd
ABCDabcd

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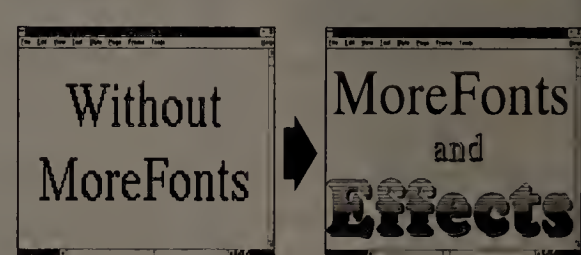

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Forest & Trees for Windows

Data Access Software Review

Robert M. Gentry
& Robert C. Bolt

A manufacturing executive at a large company types a memo in *WordPerfect* under *Windows 3.0*. Suddenly, an alarm issues from his PC and a note pops up, warning him that inventory of a key material has fallen dangerously low. The name and phone extension of the appropriate buyer also appear in the note, so the manager can instruct the buyer to correct the problem, averting a potential disaster in the nick of time.

Forest & Trees for Windows, a SQL front end by Channel Computing, can gather such critical information from disparate sources—PCs, minicomputers, mainframes—and combine it into a single customized on-screen report.

Forest & Trees' Query Assist feature allows users to set up simple SQL queries using a point-and-click interface. For complex queries, however, most executives will probably turn to an in-house developer. Using the program's application generator, a developer can set up a series of queries and display their results in a customized dashboard of "views"—windows that display vital signs like cash position. Clickable icons set up by the developer let users update the query rapidly to obtain the latest data, read and write notes, display graphs and reports, or show an information "tree" that depicts a given view's relationship to other data.

Forest & Trees offers an alarm that can include a calculation of, for example, how far off budget this week's figures are. Visual alarms can be set to pop up if expenses exceed budget by more than a given percentage. With *Forest & Trees'* timed-query capability, the information can be gathered automatically, every Monday morning, say.

When it's time to analyze the results of a query, managers can take advantage of *Forest & Trees'* report-generation and graphing capabilities. You can build an impressive array of graphs and even display them on your "dashboard." However, to print graphs, you must export them or move them via the *Windows* Clipboard to other applications.

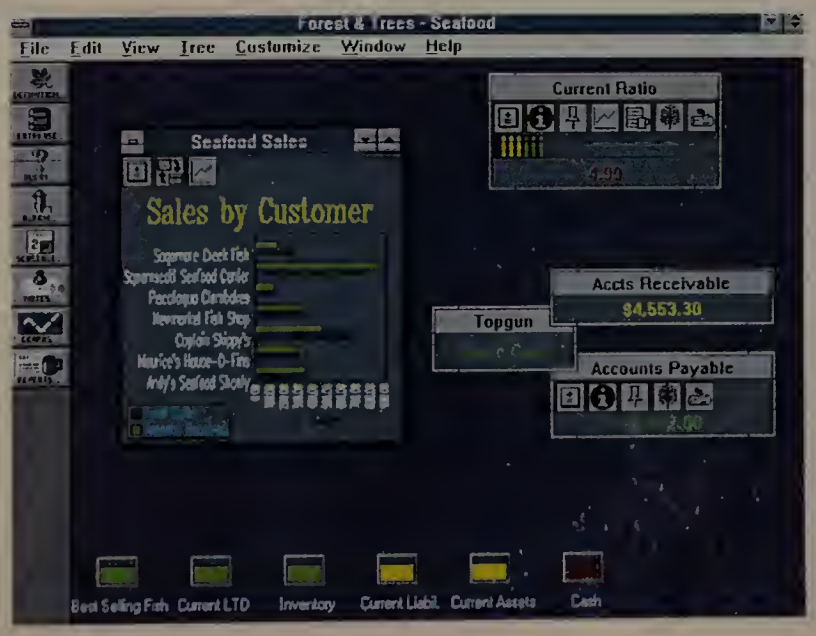
At press time, *PC World* learned that the upcoming version 2.0 of *Forest & Trees* will allow users to perform certain complex SQL functions, such as joining tables, by pointing and clicking instead of typing in commands. Additionally, users will be able to display entire tables in views instead of only single columns of data. A free upgrade will be available to all registered users.

Forest & Trees' Standard Edition costs $495 and allows you to access data in *1-2-3*, *Excel*, *dBASE*, *R:base*, *Paradox*, flat files, and ASCII files. Version 2.0 will provide a $1495 Client/Server Edition that bundles support for *Oracle Server*, Microsoft's *SQL Server*, and Gupta's *SQLBase*. An optional interface is available to *DB2*, IBM's mainframe data base, through Micro Decisionware.

Unlike data base server front ends such as *Q+E* and *Access SQL*, *Forest & Trees* can't add or update records in a data base. It appeals to managers who continually need to monitor fast-changing data stored on a LAN, a mini, or a mainframe. It's especially good for executives who want a data access program that converts critical corporate data into meaningful information.

WHERE TO BUY

Forest & Trees for Windows 1.0
Channel Computing, Inc.
53 Main St.
Newmarket, NH 03867
800/289-0053, 603/659-7590 (fax)
List price: $495 Standard Edition, $1495 Client/Server Edition
REQUIREMENTS: 2MB RAM, Windows 3.0, hard disk
TECHNICAL SUPPORT: unlimited, toll-free number, M–F 8–8
OTHER SUPPORT: 60-day money-back guarantee
Reader service no. 641



Forest & Trees allows you to create a customized "dashboard" displaying the results of queries. The results of a query can be a number, a list, or even a graph.

Data Access Software

Q+E Review

Robert M. Gentry
& Robert C. Bolt

A purchasing executive for a chain of supermarkets orders fresh produce every week. Using *Excel,* she forecasts purchasing requirements, runs what-if scenarios, and creates graphs to use in contract negotiations. But the process has a weak link: The executive can't obtain timely sales figures from the stores. The data she needs resides in an *Oracle* data base on a minicomputer, and requested reports don't reach her for at least a week.

Q+E, a multipurpose data base access tool from Pioneer Software, helps solve this type of problem. A knowledgeable user could create *Excel* macros that call *Q+E* functions, providing the purchasing executive with point-and-click access to the required minicomputer data base information and graphing it automatically as well.

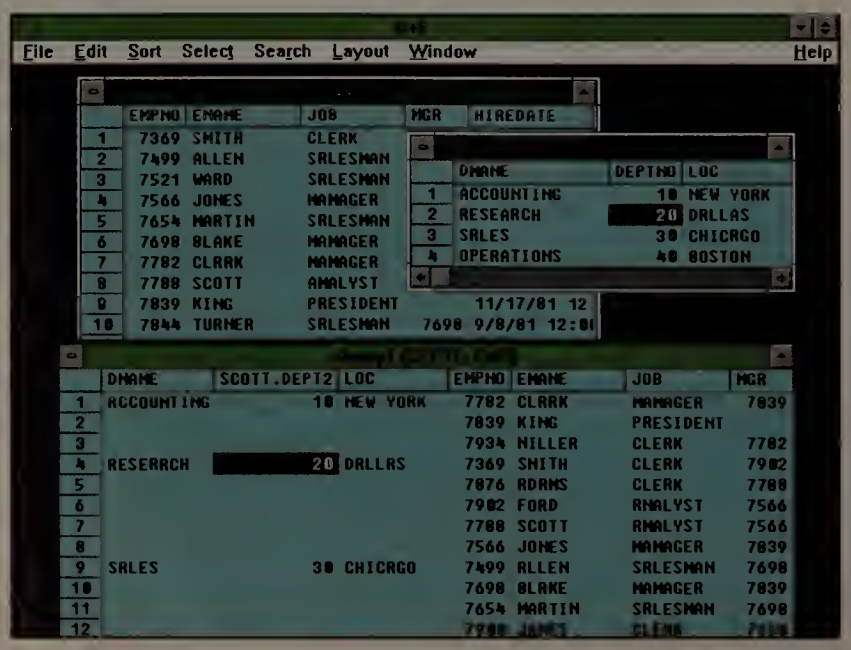
The name *Q+E* stands for *query and edit,* the product's basic data base functions. The querying portion enables you to draw data from diverse sources, while the editing tools allow you to update data in the source data base, unlike with *Forest & Trees.*

Q+E's main strength is working as an ad hoc query tool, and it makes creating queries as easy as *Access SQL* does. You create a query by pointing and clicking; the actual SQL statements are built for you behind the scenes. After you open a table, you can refine the query by simply highlighting specific columns or cells. More complicated querying, such as the purchasing executive needed, must be set up by power users familiar with DDE and *Windows* application macros.

In addition to querying data bases, *Q+E* allows you to update, delete, and add records as well as create and define new tables and data bases. Some important built-in safeguards help data base administrators manage all this power. At installation, they can choose full capabilities or limit *Q+E* to a read-only version. Anyone working with a fully capable copy must select an Allow Editing option in order to modify data in a query window. This step prevents users from inadvertently writing changes to the underlying data base.

Q+E can draw data from a healthy menu of sources. Its $199 standard edition accesses *dBASE* and compatibles and *Paradox,* as well as ASCII text files and *Excel* files. A $299 server edition adds Microsoft's *SQL Server, Oracle Server, Sybase,* IBM OS/2 Extended Edition Database Manager, IBM's mainframe data base *(DB2),* and Novell's *NetWare SQL.* Additionally, Microsoft makes its own add-in version of *Q+E* available free to registered *Excel 3.0* users. This version supports only *SQL Server, dBASE,* and ASCII files.

Unlike *Access SQL, Q+E* is not designed for developing customized, menu-driven *Windows* applications to hand off to executives or nontechnical end users. *Q+E* offers no menu-building feature, and its data entry forms capability has few customization options. However, *Q+E* finds its niche as a versatile querying tool that's especially recommended for users who need to link SQL and other data sources on one side with friendly *Windows* applications on the other.



With Q+E, you can easily set up complex SQL queries that open multiple data base tables in different windows. Here, two tables are joined in a third window (at bottom) that combines information about several company departments and their employees.

WHERE TO BUY

Q+E 2.6
Pioneer Software
5540 Centerview Dr. #324
Roleigh, NC 27606
800/876-3101, 919/859-3334 (fox)
LIST PRICE: standard edition $199, server edition $299, five-user server edition $999; Microsoft version included with Excel 3.0
REQUIREMENTS: 1.5MB RAM, Windows 3.0, hard disk
TECHNICAL SUPPORT: unlimited, no toll-free number, M–F 9–5
OTHER SUPPORT: paid support plans available; BBS for paid support plans
Reader service no. 672

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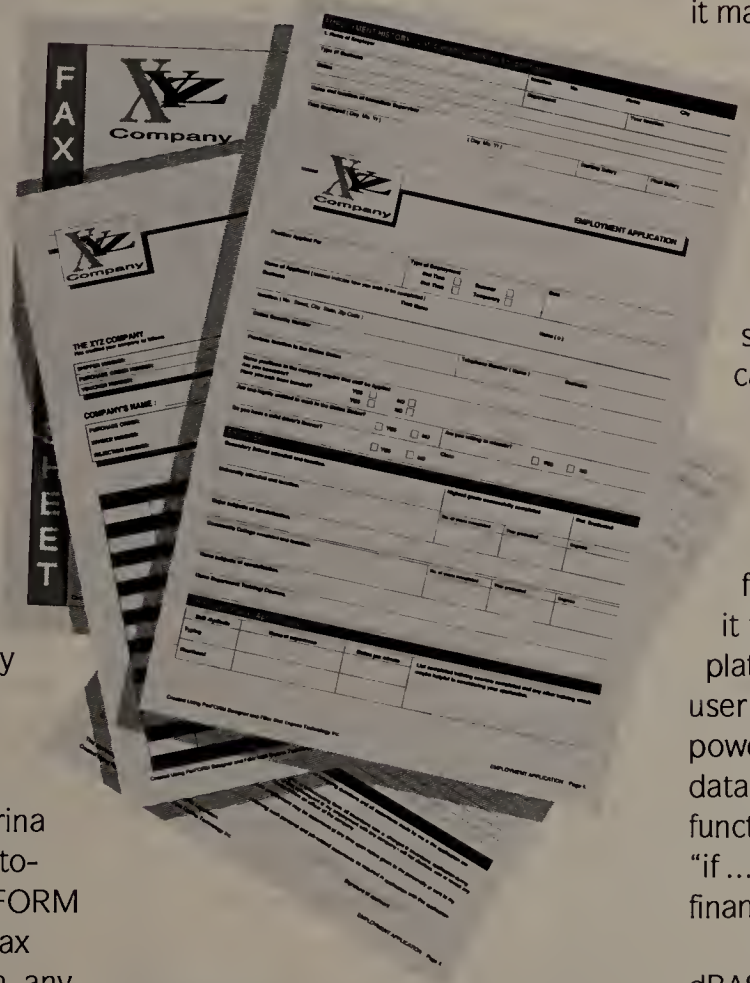

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PC World Best Buy

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Access SQL

Data Access Software Review

Robert M. Gentry
& Robert C. Bolt

At a busy mail-order company in New York, the linchpin of the entire business is a customer information data base. In the sales department, telephone sales reps enter each customer's name, address, and order information into an electronic form, automatically updating the central data base. This information is accessible in the executive office, where a top manager clicks on a custom-designed menu option that delivers an up-to-the-minute list of the top ten customers. Meanwhile, somewhere in Albuquerque, a sales manager uses a custom laptop application to tap into the same data base and update it with that day's sales leads.

Access SQL allows this kind of enterprisewide access to a central data base. *Access SQL* is a front end that can act as a stand-alone data base management system, thanks to a built-in copy of Gupta's *SQLBase* server engine. The program allows users to view, manipulate, and update information in a SQL data base and, unlike *Forest & Trees* and *Q+E,* it's geared to organizations that want to create custom applications for end users.

Like *Q+E, Access SQL* allows you to create complex SQL statements merely by pointing and clicking on standard *Windows* menus, buttons, or boxes, making it easy for managers with little training to perform ad hoc queries, view and modify tables, and access reports.

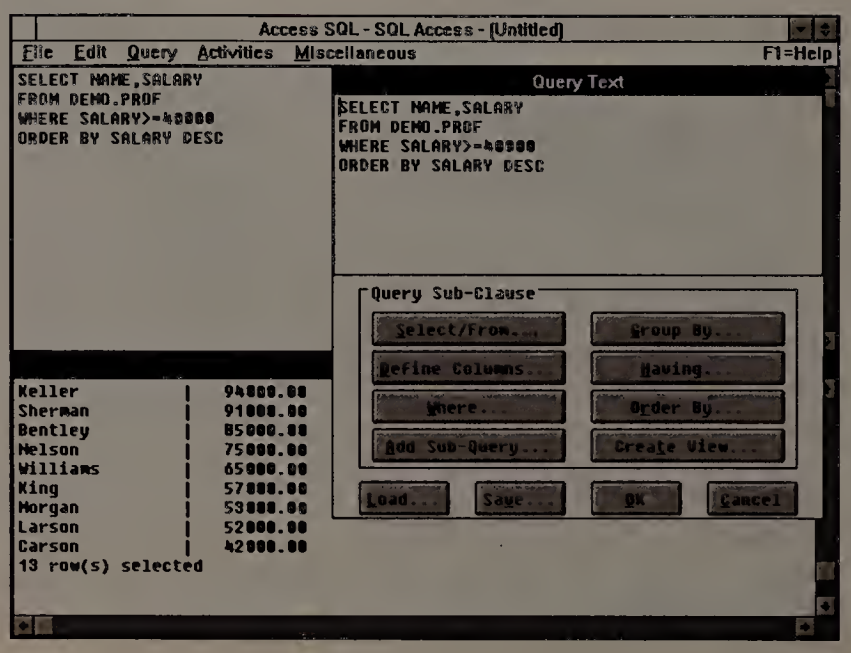
Taking full advantage of the product, however, requires a developer's services. But instead of requiring the developer to use a programming language, *Access SQL* is designed specifically as a forms development environment for creating applications such as the telephone salesperson's order entry tool.

The first step in designing a form is creating queries, which define what data will be accessible to the user. Queries can all be defined in advance or created individually and linked to different sections of a form or other application. *Access SQL* helps out with a default form layout, or you can customize the form with options like buttons, pop-up pick lists, and drop-down menus.

Although *Access SQL* has no graphing capabilities, its excellent report generation allows users to pour in data from numerous sources and to use calculated fields. Like *InfoAlliance, Access SQL* offers sophisticated data security, sure to appeal to administrators. Features include assignable passwords and privilege levels, automatic logging of data base transactions, and backup utilities.

All this power comes at a price. *Access SQL* costs $695 for the single-user version, which allows developers to build applications without being on a network, and $1595 for a network version that supports four developers. Run-time versions are extra, as are Gupta gateway products that provide back-end communication with *Oracle Server* and IBM's *DB2.* An interface for Microsoft's *SQL Server* is under development.

Unlike *Forest & Trees, Access SQL* is designed for businesses dependent on a data base that is regularly accessed and updated by several departments. Its unique benefit, compared with a tool like *Q+E,* is its ability to create customized applications, providing users with push-button access to the data they need to get the job done.



With Access SQL, it's easy to build a SQL query just by pointing and clicking. The query appears in the top window; the results (in this case, all professors who earn more than $40,000 annually) appear below.

WHERE TO BUY

Access SQL 1.20
Software Products Int'l
9920 Pacific Heights Blvd.
San Diego, CA 92121
800/937-4774, 619/450-1921 (fax)
REQUIREMENTS: 640K, Windows 3.0, hard disk; runs on any NetBIOS-compatible network
LIST PRICE: single-user version $695, four-user network version $1595, four-user run-time $545
TECHNICAL SUPPORT: 90 days free, toll-free number, M–F 8–5
OTHER SUPPORT: BBS, paid support plans available
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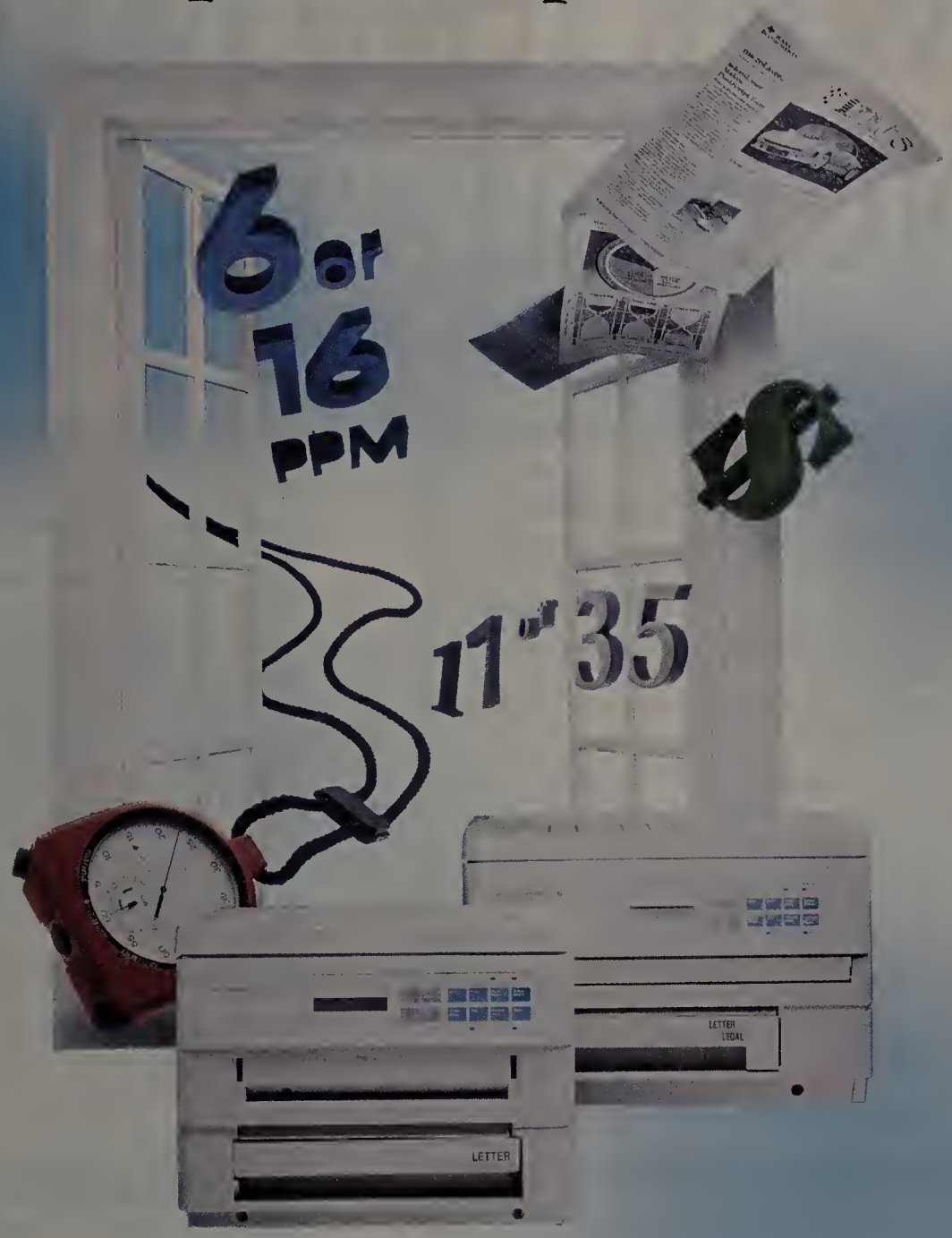
TI microLaser™ printers open new windows.



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MacUser ★★★★½

For the name of the nearest dealer, call

1-800-527-3500.

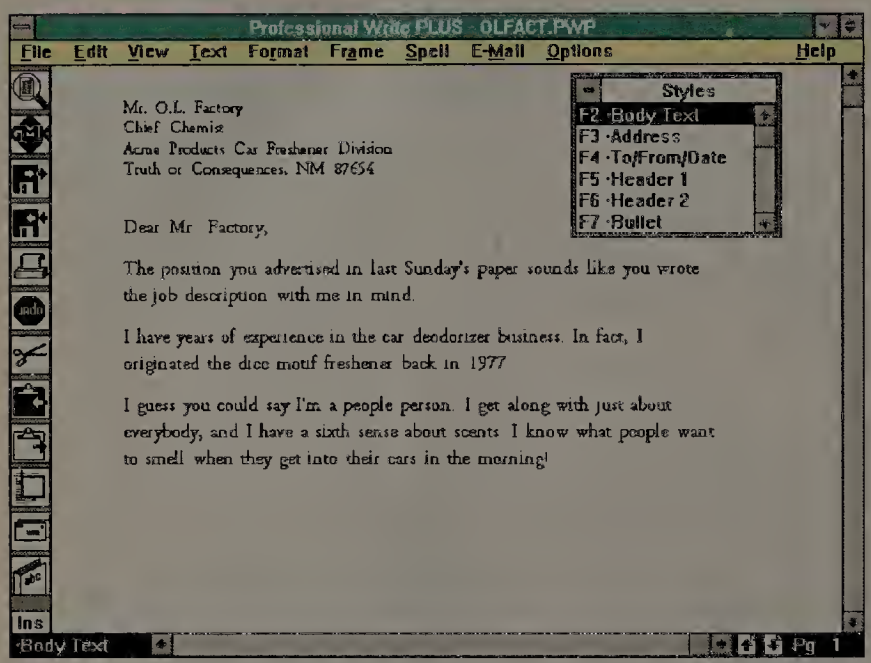
The microLaser PS17 has earned the 1990 *PC World* Best Buy award; microLaser PS35 has earned the 1990 *InfoWorld* Excellent Value award and 4½ mice from *MacUser*, October 1990.

TEXAS INSTRUMENTS

*TI suggested retail price. (Dealers' prices may vary.) microLaser is a trademark of Texas Instruments Incorporated. Adobe, PostScript and the PostScript Logo are registered trademarks of Adobe Systems, Inc. Microsoft is a registered trademark and Windows is a trademark of Microsoft Corporation. ©1991 TI 71816

Circle 296 on reader service card

Now there's a word proc
more on their minds th



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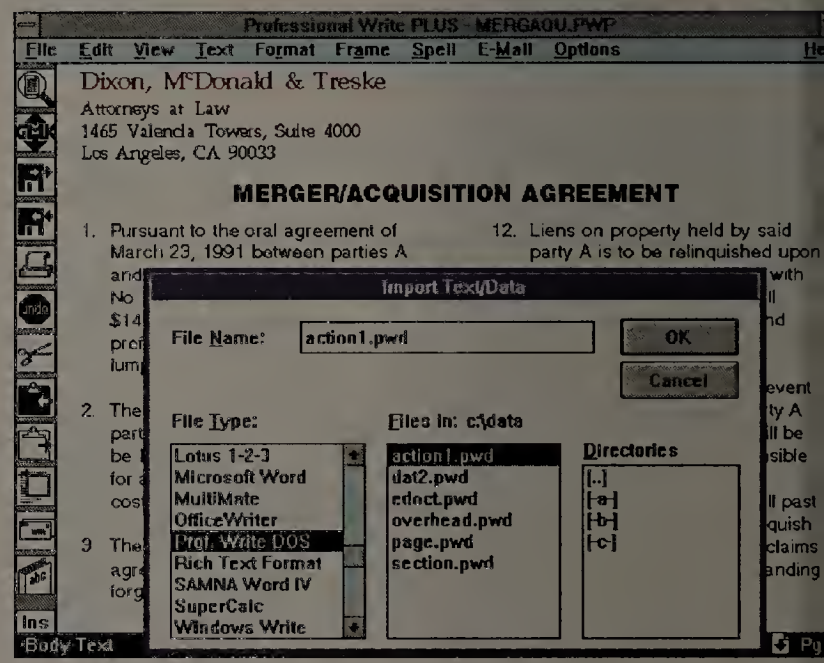
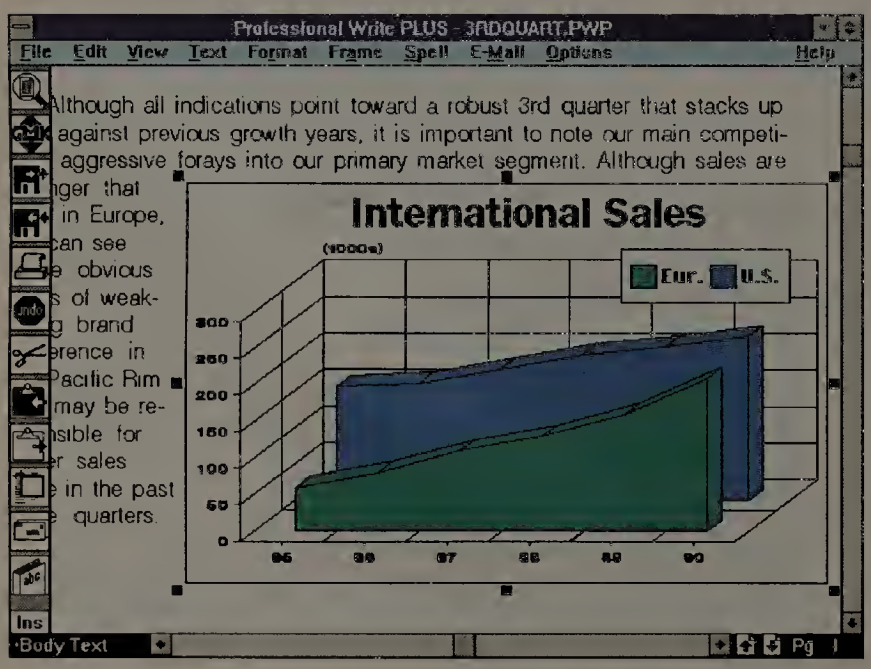
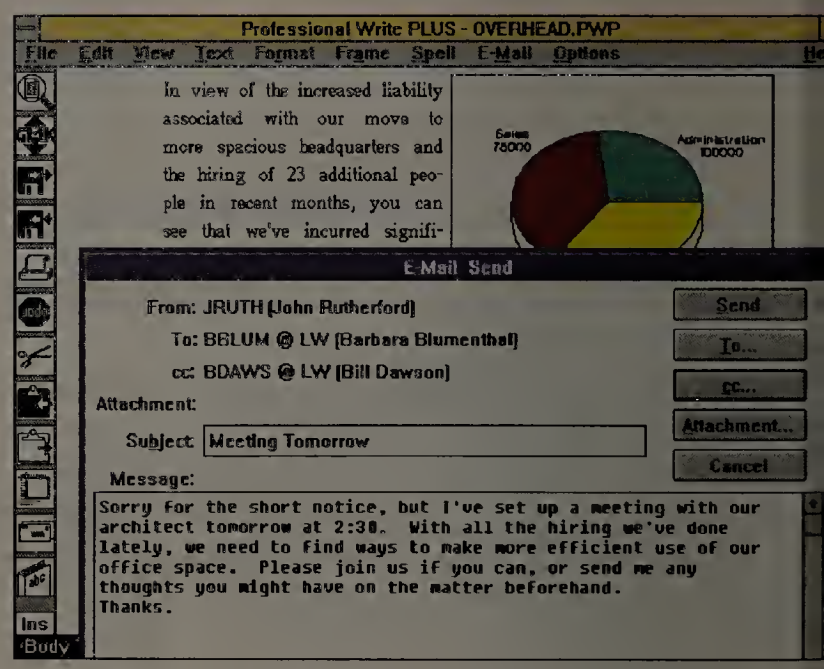


It makes nearly everybody compatible, at least as far as sharin data is concerned.



Importing graphics is a snap. And the same can be said for moving and rescaling them.



Its E-mail front end lets you send and receive messages and dat without exiting from your document.

Introducing a new concept in Windows word processing, Professiona

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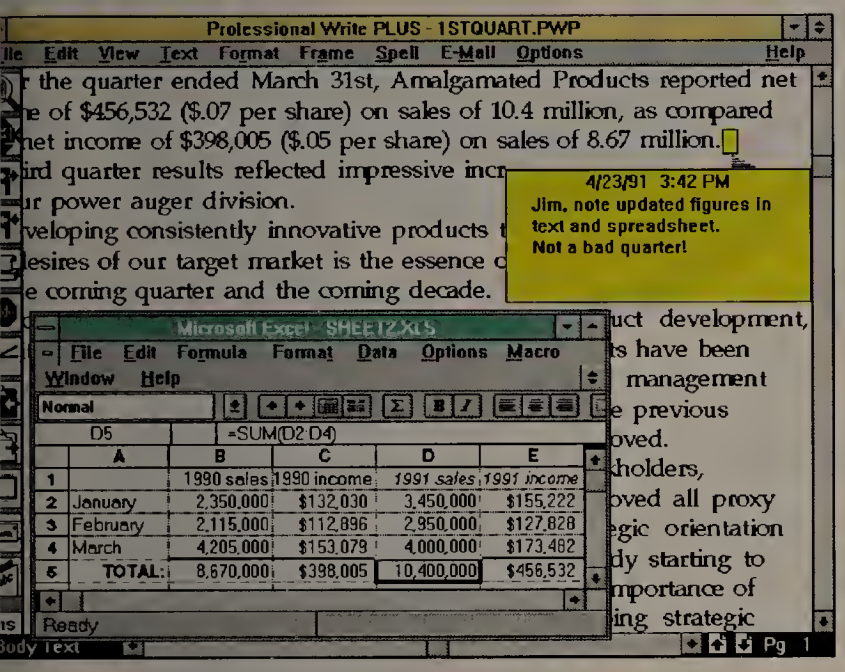
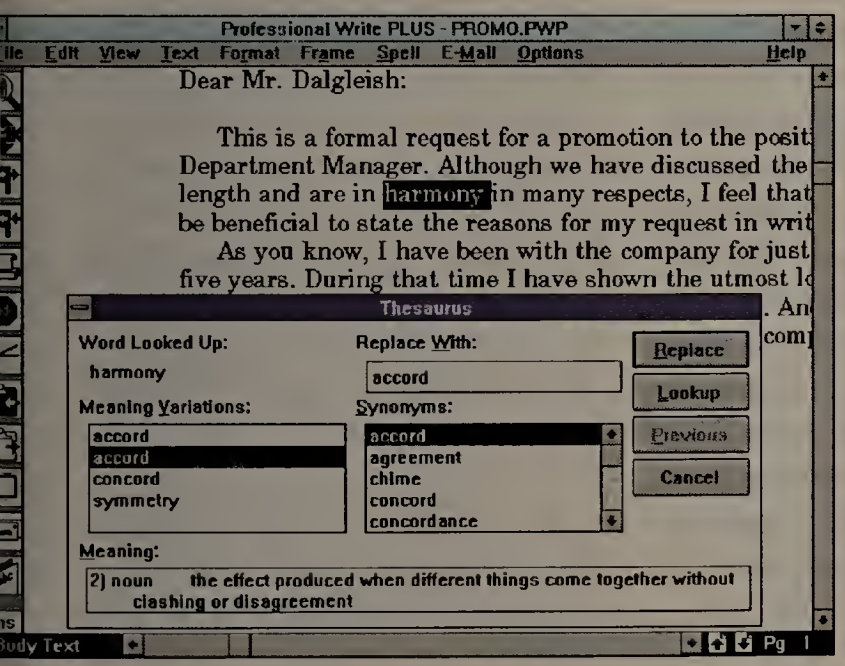
ssor for people who have n word processing.



pdating figures and text from other Windows applications is utomatic via DDE links.



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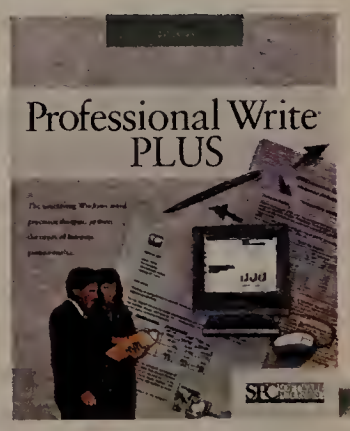

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Road Test Windows 3.0

Alice LaPlante

Users are the ultimate consumer advocates. In a new PC World series, users report from the trenches on their real-life experiences—this month with Windows 3.0.

First impressions *aren't* everything.

Only after living with a product for several months do you begin to get a real sense of its pluses and minuses and to know whether it's going to meet your needs. That's why we're instituting a new feature—the *PC World* Road Test. Each month, we'll put several users in the reviewer's seat and feature their first-person assessments of hardware and software products.

Our road testers bring to their evaluation a level of use and experience not generally found in magazine reviews. They've all used the product day in and day out—learning shortcuts, identifying strengths and weaknesses, and discovering firsthand whether it works for them. Each month, you'll be able to learn what a product is *really* like from people whose productivity and effectiveness depend on it—and you can make informed buying decisions as a result.

This month's Road Test reports the experiences and assessments of six users of *Windows 3.0*. We've selected a cross section of users who work in different professions and represent various levels of PC expertise.

Only two features got a fairly consistent review from users: the graphical user interface and the file manager. After years of experimentation, Microsoft seems to have figured out how to design an appealing and useful GUI. The same can't be said for the file manager, however, which received a barely passing grade from several of our road testers.

Read on to find out more about the features users love and the ones they can live without.

John Kirkpatrick

John is a longtime Macintosh user. He used Windows *sparingly prior to* 3.0*'s release. He uses his PC to write, edit, and format reports.*

As a corporate operating environment, *Windows* is barely adequate. It's slow and cumbersome, and it doesn't really do the things it's proclaimed to do. But *Windows* has its purposes: It introduces users to a quasigraphical environment, allows them to do rudimentary task switching, and prepares them for the more complex operating environments, such as OS/2, that are on the way.

Windows' graphical interface barely makes the grade. It's extremely slow and takes an extraordinary amount of overhead. It's a little more intuitive than DOS, but that's it.

The main reason I use *Windows* is because of its task-switching capability. But without the help of Quarterdeck's *QEMM-386 5.1*, this would be a much weaker feature, since *Windows* does such a poor job of managing its extended and expanded memory for DOS programs.

Mary Maki

Mary's been a Windows 3.0 *user since June 1990. Her job duties include developing and producing internal documents such as newsletters, manuals, forms, and fliers.*

Once you know *Windows'* limitations, you can probably get value out of it, but it didn't work for me. After using it for eight months, I gave up.

My main problem with *Windows* was how it worked—actually, didn't

JAVIER ROMERO

JACK NEWKIRK

Name: John Kirkpatrick
Title: PC specialist
Company: GDS Associates (electric utility consultants)
Hardware: 20-MHz 386, 4MB RAM, 100MB hard drive
Software: *Charisma, Designer, WordPerfect, 1-2-3*

KYLE KEELER

Name: Mary Maki
Position: Graphic specialist
Company: Bell Atlantic
Hardware: 16-MHz 386, 12MB RAM, 40MB hard drive
Software: *Ventura Publisher, Designer, PageMaker*

ADRIENNE HELITZER

Name: Munir Mandivawalla
Title: Teacher/graduate student
Organization: Claremont Graduate School/Cal Poly Technical Institute
Hardware: 25-MHz 386, 4MB RAM, 40MB hard drive
Software: *Word for Windows, Corel Draw, Excel*

work—with *Ventura Publisher.* The PostScript driver didn't support the paper sizes I use with my Linotronic typesetter, and a number of *Ventura*'s features weren't usable under *Windows,* even though they worked fine under *GEM.*

The multitasking aspect of *Windows* isn't a big improvement over DOS. I rarely got the cursor back while something was processing in the background. The file management system also needs work. It's so confusing that for a long time I thought I was doing something wrong. Then I realized it was just poorly implemented.

For me, *Windows'* strongest feature was being able to cut and paste between applications. But I can't say *Windows* improved my productivity. I lost a lot of time because of all the bugs.

Munir Mandivawalla

Munir became a "regular" Windows *user after the introduction of version 3.0. He uses his PC primarily for word processing and for tracking and tabulating student grades.*

Windows is still a fairly primitive environment, but with the advent of *3.0* it's usable for most business purposes.

The graphical interface is getting there, but it needs to be more object oriented—like Hewlett-Packard's *NewWave.* I'd like to be able to put together documents from different applications and interact with them directly.

Under *Windows* there'll always be some applications that won't work the way others do. I guess we'll just have to live with the inconsistencies.

The cut-and-paste feature is fine for anything that has to do with text. But for graphics, some formats make it impossible to do smooth cuts and pastes.

A lot of people have said that their productivity increased tremendously because of *Windows.* I'd put a different spin on it: My effectiveness has increased. The things I now do, using *Windows,* I just wouldn't have attempted before.

Mark McNally

Mark has been using Windows 3.0 *since it debuted last spring. He uses his PC primarily to manage his investment portfolio.*

Right from the beginning, I was amazed at how easy it was to maneuver and navigate through *Windows.* I was able to pick up *Word for Windows* and *Excel* almost immediately and start cutting and pasting text between them.

The WYSIWYG feature is especially important. Before, I had to print things several times before I got them right. Now, with Print Preview, I can see how things are going to turn out before I print them.

But DDE is probably the key feature that *Windows* offers. I used DDE to write a program that allows *Crosstalk for Windows* to call up Dow Jones News/Retrieval, cut out the stock quotes I need, and automatically download them into an *Excel* spreadsheet. Then, *Excel* performs the necessary calculations and creates a chart, which is there waiting for me in the morning.

My biggest complaint? There's not enough information about DDE. I had to figure it out and teach it to myself. It took a lot of trial and error, which kind of wasted my time. In the end, however, it was worth it.

Sharyn Pendleton

Sharyn never used a PC before Windows 3.0 *was introduced. She uses* PageMaker *to create a calendar of classes offered by the city of San Carlos.*

I like *Windows,* but I needed a lot of training to get where I am today—and I still don't understand all the features. I'm still a little intimidated. Anyone who says you can use *Windows* immediately even if you don't know anything about PCs is dead wrong! Still, *Windows* makes using the computer less intimidating. It lets me do my job and insulates me from having to understand the technical stuff.

The cut-and-paste feature is my fa-

PAM ADAMS

Name: Mark McNally
Title: Store manager
Hardware: 20-MHz 286, 4MB RAM, 40MB hard drive
Software: *Word for Windows, Excel, Crosstalk for Windows*

BRIAN DEVON

Name: Sharyn Pendleton
Title: Administrative clerk
Organization: City of San Carlos, California
Hardware: 386SX, 2MB RAM, 40MB hard drive
Software: *Word for Windows, PageMaker, Excel, Arts & Letters*

JON READ

Name: Bob Raeside
Title: Administrator
Company: Rockwell International
Hardware: 20-MHz 386, 4MB RAM, 110MB hard drive
Software: *Word for Windows, PageMaker, Corel Draw, Excel, 1-2-3, Freelance Plus*

vorite. It's a real improvement over actually cutting and pasting strips of paper that come out of a printer! But the WYSIWYG feature isn't perfect. We bought a PostScript cartridge for our LaserJet, and the document isn't coming out the way it looks on the screen. So I have to print things out over and over again until I get it right.

I haven't had the nerve to try the multitasking feature yet. I'm nervous I'll lose what I'm working on. I've come a long way—I used to be afraid to touch anything on the keyboard.

Bob Raeside

Bob's been using Windows *since version 2.0 was released, and switched to version 3.0 last spring. He uses his PC to write reports, review documents, and track budgets.*

The difference between working in a *Windows* and a non-*Windows* environment is like night and day. The obvious strong point is that *Windows* applications all look and feel the same. In just a few minutes you can get up to speed on a program you've never seen before.

But multitasking is really why you buy *Windows*. I'm constantly going back and forth between applications—from a graphics package to a spreadsheet and back to E-mail.

The cut-and-paste feature just doesn't hack it in non-*Windows* applications, though. It's not a smooth operation. I don't care for the file manager, either. It's cumbersome, and nothing follows intuitively. There's also no easy way out of the thing. I use *Norton Commander* instead.

Making the switch to an entirely *Windows* environment isn't easy. I consider myself fairly adaptable, but I just couldn't give up *1-2-3*. I think until more *Windows* packages are available, a lot of users won't want to switch: It means they have to relearn *everything*. ●

Sharon Fisher is a San Francisco–based freelance writer specializing in data communications. Robert M. Gentry is vice president and Robert C. Bolt is president of Database Server Systems, a consulting company in South San Francisco that specializes in data base servers and client-server technology. Alice LaPlante is a freelance writer in Palo Alto, California.

Windows 3.0 Report Card

Features	John Kirkpatrick	Mary Maki	Munir Mandivawalla	Mark McNally	Sharyn Pendleton	Bob Raeside
Graphical interface	C+	B-	B	A	B	B
Consistency between applications	D	B	A	A	B	A
Ability to cut and paste	C	A	C	A	A	C
WYSIWYG	B	C	B	A	C	B+
DDE	B+	*	B	A	*	*
Multitasking	A	C	A	A	*	A
File management system	C-	C-	B	B	B	D-
Overall	B	C	A	A	B	B

*User has not fully tested or used feature

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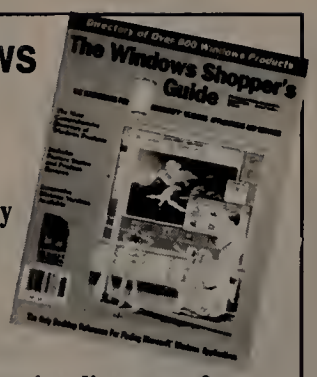

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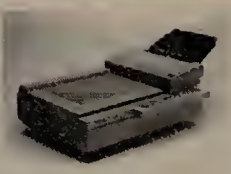

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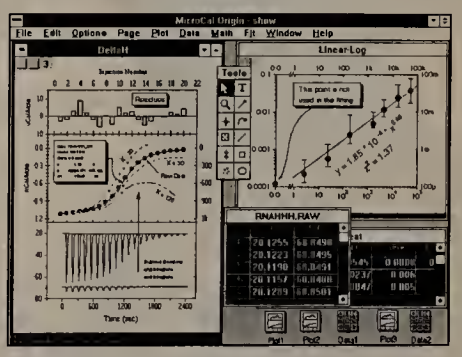

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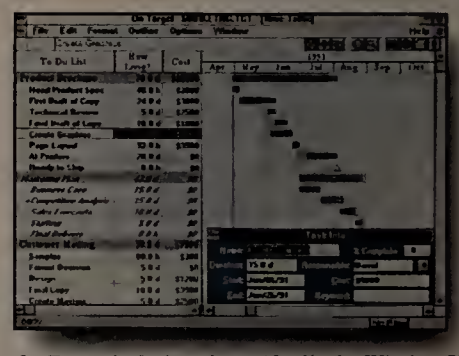

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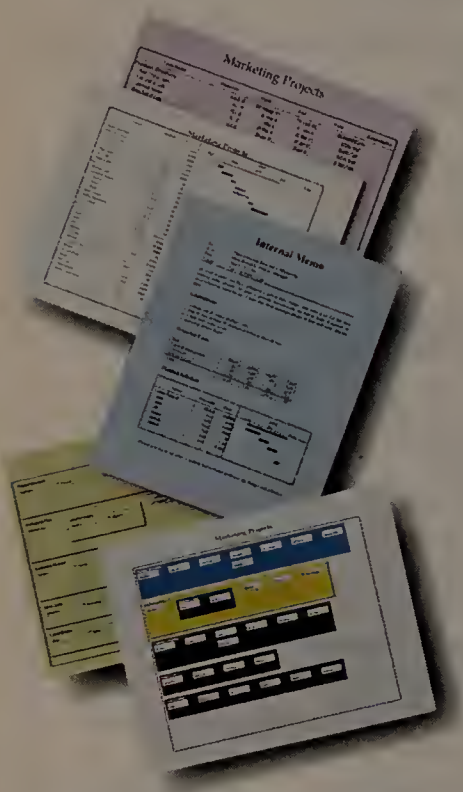

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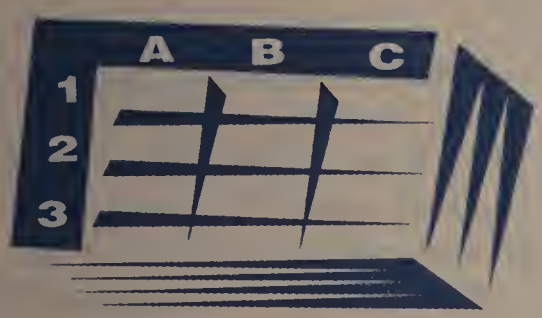
Create Spreadsheet Reports With Style

Need to get a message across with numbers? Here's how to create effective spreadsheet reports using tried-and-true desktop publishing techniques.

John Walkenbach



Spreadsheets

What happens when one of the new graphical spreadsheets joins forces with a laser printer? Depending on the user's knowledge of design, the result can be an attention-grabbing document—or a forbidding report likely to land in the "read it later" pile.

In the past, formatting a spreadsheet report involved little more than underlining titles and adding dollar signs and decimal places. Today, the process includes specifying fonts, attributes like italics, type size, borders, shading, and even clip art. This article presents basic layout and design tips to help you produce visually effective reports—without overwhelming your reader.

▶ Clarity Is the Goal

The purpose of a spreadsheet report should be immediately obvious to anyone who looks at it. To avoid losing the reader in endless columns of numbers, you should support your message with titles and explanatory text, as shown in our first example.

To emphasize your main points, it's useful to set off headings and titles by shading them. But boldface the text so it's legible.

Although colored backgrounds and text might look great on screen, background colors are often converted to patterns of dots on a black-and-white printer. Run some tests before you spend too much time manipulating colors.

If your spreadsheet supports embedded images, you can use clip art—as long as it really adds to your message. As shown in our second example, clip art can easily make a serious report look frivolous.

Another design flaw is putting too much information on a page. If you can, spread lengthy reports across several pages, and avoid the temptation to reduce margins to squeeze in a few extra columns or rows.

On the other hand, you don't want to push only a few lines onto a second page. The Print to Fit features in *Quattro Pro* and *1-2-3* can help: They squeeze your report by using smaller fonts. In *Quattro Pro 3.0,* you can accomplish this by selecting */Print* followed by *Print to fit.* In *1-2-3*, release 2.3, use *:Print Layout Compression Automatic.*

▶ Working With Fonts

It's only natural to want to get the most out of your new PostScript printer or font cartridge by using multiple type styles. But for readability, you should

The Good, the Bad, and the Ugly

Loan Amortization Schedule

Prepared for: Bill and Mary Higgins
July 13, 1991

This amortization schedule shows the amount of each monthly payment that is applied to interest and principal for the first five years. It is based on the following assumptions:

Purchase Price	$195,000
Down Payment	$40,000
Loan Amount	$155,000
Interest Rate	12.50%
Term (in months)	360

Month	Payment Amount	Paid to Interest	Paid to Principal	New Balance
1	$1,654	$1,614	$40	$154,960
2	1,654	1,614	40	154,920
3	1,654	1,613	41	154,879
4	1,654	1,613	41	154,838
5	1,654	1,612	42	154,796
6	1,654	1,612	42	154,754
7	1,654	1,612	42	154,712
8	1,654	1,611	43	154,669
9	1,654	1,611	43	154,626
10	1,654	1,610	44	154,582
11	1,654	1,610	44	154,538
12	1,654	1,609	45	154,493
13	1,654	1,609	45	154,448
14	1,654		46	154,402

* Loan Amortization Schedule *

Price:	*$195,000.00*
Down Payment:	*$40,000.00*
Loan Amount:	*$155,000.00*
Interest Rate:	*12.5000%*
Term:	*360 months*

Period	Payment Amount	Paid to Interest	Paid to Princ.	New Balance
1	$1,654.25	$1,614.58	$39.67	$154,960.33
2	$1,654.25	$1,614.17	$40.08	$154,920.25
3	$1,654.25	$1,613.75	$40.50	$154,879.76
4	$1,654.25	$1,613.33	$40.92	$154,838.84
5	654.25	$1,612.90	$4	$154,797.49

Loan Amortization Schedule

Price:	$195,000.00
Down Payment:	$40,000.00
Loan Amount:	$155,000.00
Interest Rate:	12.5000%
Term:	360 months

Period	Pmt Amt	Interest Pd	Pd/Princ	Balance
1	$1,654.25	$1,614.58	$39.67	$154,960.33
2	$1,654.25	$1,614.17	$40.08	$154,920.25
3	$1,654.25	$1,613.75	$40.50	$154,879.76
4	$1,654.25	$1,613.33	$40.92	$154,838.84
5	$1,654.25	$1,612.90	$41.34	$154,797.49
6	$1,654.25	$1,612.47	$41.78	$154,755.72

In the first example (above left), a clear, concise spreadsheet report presents a personalized message at the top and elaborates with numbers below. The second example (top right) uses less text and too many enhancements, which give the report a frivolous look and make it difficult to understand. The absence of formatting in the third example makes it, quite simply, an undifferentiated sea of confusion.

limit most documents to two typefaces.

Use different type sizes and enhancements to set off titles, headings, and subheadings. But don't go overboard: Too many enhancements make a report illegible. Use bold, italic, and underlining only for titles and headers; sans serif fonts such as Helvetica or Swiss make numbers easier to read.

A good photocopier can extend your printer's capability. For example, if your report format is landscape and your printer has the fonts you need only in portrait mode, specify smaller type in portrait mode, and use the copier to reorient the page and enlarge it.

▶ Consistency Is Critical

If you design multipage reports, you'll want elements to be consistent from page to page. The reader's eye should focus on the message, not the design.

Many spreadsheets provide a style option to maintain a coherent look. You define a style using fonts, type size, enhancements, colors, and borders; you can apply it to given cells or globally.

It's easy to set up a style. In *Excel 3.0*, select a cell formatted to your liking, then click on *Format*, click on *Style*, and type a name for the style. To apply the style, select the cells you want to format, then click on the arrow next to the current style in the tool bar.

In *1-2-3 2.3*, you can format by selecting any of the WYSIWYG format commands. Then select *:Named-style Define* and specify one of eight styles provided. Select the formatted cell, and give the style a name and description. To apply the style, select *:Named-style*, choose the number from 1 to 8 that represents the style you defined, then select the cells you want to format.

Quattro Pro's styles don't apply across worksheets, but you can "define" up to eight fonts for the same worksheet. Select */Style Font Edit-fonts*, then choose any of eight predefined fonts to edit. Menus guide you through the definition of typeface, size, color and attributes. To use a defined font in a cell or range, select */Style Font*, choose the font number, and select the cells to format.

When printing a multipage report, you'll want your output to be consistent, too. Selected row and column titles should automatically appear on each page. In *Excel 3.0*, simply select your header row or column, then click on *Options*, and select *Set print titles*. In *Quattro Pro*, use */Print Headings;* in *1-2-3*, select */Print Printer Options Borders*, and choose columns or rows.

Creating an attractive spreadsheet report involves some trial and error. Since you usually can't see an entire page at once, use the page preview to save trips to the printer. By using these rules, you'll create a well-designed report with maximum impact. ●

John Walkenbach is a contributing editor for PC World.

Words Into Print

Word Processing

Tips for getting the most out of your word processor

This month: Address letters quickly with your word processor's boilerplate text features, and import data base files of addresses into Word and WordPerfect.

George Campbell

If you're typing addresses from your Rolodex into letters or other documents, you're wasting the power of your word processor. Instead, why not simply insert addresses electronically? Using any word processor's boilerplate text feature, you can create a list of frequently used addresses for instant insertion.

Using Word Glossaries

In all versions of *Word* prior to version 5.5, you can use the glossary to insert an address automatically. After entering an address and salutation, highlight the text. Press **<Esc>c**, type any abbreviation to stand for the address, and press **<Enter>**. To make the shortcut permanent, save the glossary by pressing **<Esc>tgs<Enter>**.

In *Word 5.5*, follow the same steps but press **<Alt>-EO**, type the abbreviation, then press **<Alt>-D** to store it.

Now you can insert the address at the cursor position in any document. Just type the abbreviation and press **<F3>**, or press **<Esc>i<F1>** and choose from a list of abbreviations. In *Word 5.5*, press **<Alt>-EO** to pick from a list.

WordPerfect 5.x Block Saves

WordPerfect doesn't offer glossary files, but it's easy to create address files, then merge them into your documents.

Type an address and salutation, move the cursor to the beginning of the first line, press **<Alt>-<F4>**, and mark the block. Press **<F10>** to save the address, and type a name for it.

Insert an address block in a letter by positioning the cursor, pressing **<Shift>-<F10>**, typing the block's name, and pressing **<Enter>**. If you have forgotten the name, press **<F5>** **<Enter>**, choose the file, then press **r**.

Automating Long Address Lists

If you work with many addresses, you'll have a hard time remembering all those

WORDPERFECT SHORTCUT

Importing Addresses from Data Base Files

If you have addresses stored in a data base, your *WordPerfect* address list is halfway completed. All you have to do is convert and format the text.

Start by exporting your data in comma-delimited or mail-merge format from within your data base. You'll get an ASCII text file, with records surrounded by quotation marks and separated by commas. Export just the fields you'll use in the address blocks, in the order you'll use them.

To bring the file into *WordPerfect*, press **<Ctrl>-<F5>tr**, type the path and file name for the exported data, then press **<Enter>**. Save the file under a new name in case you make an error.

To format the address list, you need to add codes to the imported data base file. To format the file while it's still loaded, do the following keystrokes, step by step:

1. **<Alt>-<F2>n<Alt>-<F2>,<Alt>-<F2><Home><Home><Cursor Up>**
2. **<Alt>-<F2>n<Enter><Alt>-<F2><Enter><Enter><Alt>-<F2><Home><Home><Cursor Up>**
3. **<Alt>-<F2>n<Alt>-<F2><Enter><Alt>-<F2><Home><Home><Cursor Up>**
4. **<Alt>-<F2>n<Alt>-<F2><Alt>-<F2><Home><Home><Cursor Up>**
5. To save the new file, press **<F10><Enter>y**.

If your original data base used separate fields for first and last names, or for cities, states, or ZIP codes, you'll have to do a little editing to finish the job.

abbreviations. Fortunately, you can use your word processor's document-switching and split-screen features to make address selection easier.

Start by creating your address list. Type the addresses in a blank document just as they will appear in your letters, separating each address with a blank line. Then follow these steps:

1. Split the screen or switch documents.
2. Load your address list in the second document.
3. In the address list screen, search for a name or other text.
4. Mark the address as a block.
5. Switch back to your letter document and paste the block in at the cursor position.

By taking advantage of WordPerfect's split-screen function, you can copy an address from an address file and paste it into your working document.

Word 4.0/5.0 List Tools

Here's how the process works in *Word:*

Open a blank screen (for the letter), then follow these steps:

1. To split the screen, press **<Esc>wsh12<Tab>y<Enter>**.
2. To load the list, press **<Esc>tl**, type the list's file name, then press **<Enter>**.
3. Press **<Esc>s** to open the search function, enter a name or other information you want to find, and press **<Enter>**.

Word will locate the address.

5. Select the address text. (If you used **<Shift>-<Enter>** within the address, you can press **<F10>** to select the entire address.)
6. Press **<Delete><Insert><F1><Insert>** to paste in the block.

WordPerfect Address Lists

Users of *WordPerfect 5.0* or later versions can follow a similar approach:

1. To split the screen, press **<Ctrl>-<F3>w12<Enter>**.
2. Press **<Enter><Shift>-<F3>** to switch back to the document window.
3. To load the address list, press **<Shift>-<F10>** and type the list's file name.
4. To search for an address, press **<Home><Home><Cursor Up><F2>**, type the search text, and then press **<F2>** again. If you need to continue the search, press **<F2>** twice to repeat the process.
5. Move the cursor to the beginning of the address, press **<Alt>-<F4>**, then highlight the block with the cursor keys.
6. To copy the block to the letter, press **<Ctrl>-<F4>bc<Shift>-<F3><Enter>**.

With other word processors, you can follow similar steps, substituting the appropriate keystrokes for your program. In *Word* and *WordPerfect*, you can also record macros to further automate the job. ●

George Campbell is a contributing editor for PC World.

WORD SHORTCUT

Importing a Data Base File to Word

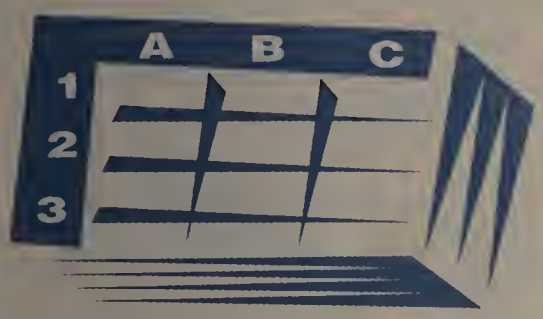
If you have a data base file containing addresses, you can turn it into a *Word* address list. Start by exporting the comma-delimited data base file as an ASCII file. (If your data base has more than 500 records, you'll have to break it into smaller chunks.) Then load the exported file into a blank *Word 4.0* or *5.0* screen. Save the file under a new name.

To convert the file for use as a *Word* address list, complete with proper formatting, press the following keys:

1. **<Esc>r<Tab><Enter><Esc>ts**
2. **<Esc>rp<Tab>pp<Enter><Esc>ts**
3. **<Esc>r<Tab>n<Enter><Esc>ts**
4. **<Esc>r<Tab><Delete><Enter><Esc>ts**

You'll have to do some editing if names, cities, states, or ZIP codes are broken into separate fields in the original data base.

Spreadsheets (A..Z)



Spreadsheets

Practical tips for building better worksheets

This month: What if...?

Richard Scoville

Survival in business hinges on making smart financial decisions; your spreadsheet program can improve on your intuition by letting you explore options before taking the plunge. This column introduces sensitivity analysis in *1-2-3* release 2.2—a general what-if method for evaluating cost benefits of various scenarios based on one input variable. Our example is purchasing a cellular phone service, but you can apply the same steps to adopting a pricing policy, for example, by projecting profits or to selecting optimum investment plans by projecting returns.

In our scenario, we assume you've already chosen the model of cellular phone you're going to buy. Even more important is which billing plan to select. Most plans charge a base amount each month, which covers a specified amount of airtime. Once you've used up that time, you pay by the minute. You anticipate using the phone for about 75 minutes per month; the salesperson suggests the Value plan. It sounds reasonable, but you'd like to know how the bill would look if you used the phone more or less than you've projected.

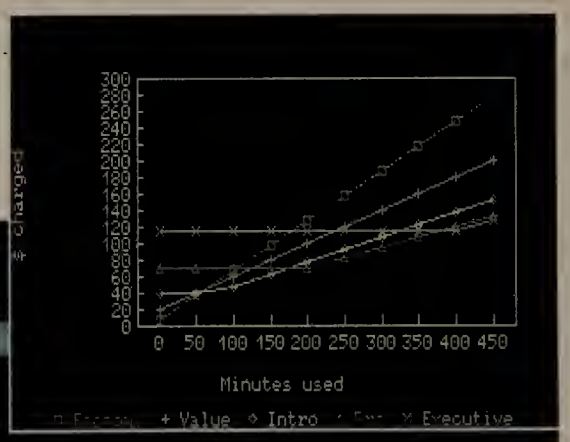
The worksheet in **FIGURE 1** shows a prototypical approach. It consists of a data entry area containing pricing criteria for each plan based on the single input variable of 75 minutes' monthly usage, a table (generated with the Data Table command) to compare charges for different usage levels, and a graph to provide clear comparisons.

To build the model, begin with a blank worksheet and use the following steps to keep all the numbers consistent: Select */Worksheet Global Format,* and press **<Enter>**. Enter the labels and numbers in A1..F8, and the label in A10. To highlight the data entry cells, move to cell B3 and select */Range Unprotect,* and press **<Enter>**. Repeat the procedure on the range B6..F8.

Now compute the monthly charges. Move to B10 and then enter the formula **@IF(B3<B7,B6,(B3-B7)*B8+B6)**. In English, this rather tricky formula means that if the number of minutes used (B3) is less than the number of free minutes per month (B7), then display just the base fee (B6); otherwise, calculate the number of minutes used in excess of the free minutes (B3-B7), multiply it by the per-minute price (B8), and add that figure to the base fee (B6). The dollar signs denote absolute cell addresses to ensure that when you copy the formula, all the copies refer to cell B3 instead of the equivalent in other columns. After entering the formula in B3, select */Copy,* press **<Enter>**, move to

Two Ways to Count the Costs

FIGURE 1: One worksheet can show you your least expensive phone rental options in two ways: in a data table, with figures for a range of minutes of usage, and in a graph.



B10: @IF(B3<B7,B6,(B3-B7)*B8+B6)

	A	B	C	D	E	F
1	Cellular Phone Payment Plans					
2						
3	Minutes Used	75				
4		Economy	Value	Intro	Pro	Executive
5						
6	Base fee	7.50	20.00	39.95	69.95	114.00
7	Free Minutes	0	0	75	200	400
8	$ per Excess Minute	0.60	0.40	0.30	0.25	0.25
9						
10	Monthly Charge	52.50	50.00	39.95	69.95	114.00
11	0	7.50	20.00	39.95	69.95	114.00
12	50	37.50	40.00	39.95	69.95	114.00
13	100	67.50	60.00	47.45	69.95	114.00
14	150	97.50	80.00	62.45	69.95	114.00
15	200	127.50	100.00	77.45	69.95	114.00
16	250	157.50	120.00	92.45	82.45	114.00
17	300	187.50	140.00	107.45	94.95	114.00
18	350	217.50	160.00	122.45	107.45	114.00
19	400	247.50	180.00	137.45	119.95	114.00
20	450	277.50	200.00	152.45	132.45	126.50

12-Aug-91 10:52 AM UNDO NUM

C10, press <**Period**>, use the cursor keys to highlight the range C10..F10, and press <**Enter**> again.

By plugging various values into B3, you can compare the cost of the plans for a given amount of airtime; the next step is to build a table to lay out the plan costs for an array of minutes. Start by building the list of minutes: Move to cell A11, select */Data Fill*, press <**Period**>, use the cursor keys to highlight the range A11..A20, and press <**Enter**>; enter **0** for the Start value, **50** for the Step value, and **450** for the Stop value. Next, the table of charges: Put the cell pointer on A10 and select */Data Table 1*, press <**Period**>, highlight the range A10..F20, and press <**Enter**>. Then, enter **B3** for the input cell.

The table gives you an idea of how costs vary under each plan. To make things clearer, turn the table into a line graph. Put the cell pointer on A11 and (in *1-2-3* release 2.2 or 3.*x*) select */Graph Group*. Press <**Period**>, use the cursor keys to highlight the range A11..F20, and press <**Enter**>. Select *Columnwise*, and the graph ranges are set to display the plan costs. To set up a graph legend, select *Options Legend Range*, move to cell B4, press <**Period**>, highlight the range B4..F4, and press <**Enter**>. Select *Color* to display your graph in color. Choose *Titles* to label the *x*-axis **Minutes used** and the *y*-axis **$ charged.** Select *Quit* to return to the Graph menu, then *View* to see the data.

Now you've got the big picture. The Economy plan is cheapest when airtime is less than about 50 minutes per month. If airtime is between 50 and about 180 minutes, you'll want the Introduction plan; between 180 and about 375, the Professional plan; above 375, the Executive. For your projected use of 75 minutes, the choice is clear: the Introduction plan. It's interesting that there's always a plan less pricey than the one they recommend.

Richard Scoville and Ralph Soucie are contributing editors for PC World.

SPREADSHEET TOOLBOX

Allowing for Uncertainty in What-If Analysis

If you've ever drafted a budget and suspected you were just guessing at the numbers, you'll appreciate *Delta Manager 1.11*'s frank approach to uncertainty. Instead of the single value a *1-2-3* sensitivity analysis can handle, this add-in lets you enter a range of values. For example, if you think sales will be $80,000 plus or minus $10,000, you enter **70000<x<10000**. *Delta Manager* assumes your data is based on a normal distribution and takes your high and low values to be the standard error. From then on, all your calculations reflect the appropriate range of uncertainty, which you can adjust to a 68, 95, or 99.7 percent confidence interval. So you might find out, based on your input uncertainty, that profits will likely range from $5000 to $8000 but could go as high as $12,000 or as low as $1000!

Like all statistical procedures, *Delta Manager*'s can mislead naive souls who violate its underlying assumptions—for instance, that the input variables for which you've estimated uncertainty are statistically independent. But *Delta Manager* beats guessing, and it can give you a real sense of the range of results you can expect.

Delta Manager $99.95; PC Publishing, 1033 Massachusetts Ave., Cambridge, MA 02138, 617/661-8050, 617/661-7811 (fax)
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EXCEL SHORTCUT

One-Step Graph Title Updates

Ralph Soucie

If you update a worksheet and chart each month—for a sales summary, for example—you can change both titles at once by linking the title cells. To illustrate the technique, open a worksheet and enter a title in cell A1. Enter some sample numbers and select the range containing them, then choose *File New* and select *Chart*.

When the chart file opens, select *Chart Attach Text* and choose the *Chart Title* option. Type an equal sign, =, then change to the worksheet window and point to cell A1. The cell address appears in the formula bar. Press <**Enter**>; the text entry in the worksheet appears as the title of the chart. Any changes to the contents of cell A1 will be reflected automatically in the chart title. You can link other chart text objects (such as axis labels and unattached text) to worksheet cells in a similar manner.

Data Basics

Data Management

Tips and techniques for managing your data

This month: The dating game

Steve Cummings

When is as important a business question as *what* or *how much*, and learning your data manager's date-related capabilities can help you find the answer. Whether you want a tally of all your receipts from last October, a list of employees hired after August 1, 1990, a warning to pop up two weeks before a deadline, or the average price you paid for pencils during the past 30 days, you can make good use of some simple functions that identify and manipulate date information.

Let's start with a simple example: suppose you keep a to-do list similar to the one I described in the June column, where every task has a date field called Deadline. Think of how convenient it would be (albeit depressing) to quickly pull up your most pressing chores—those due today or (even worse) yesterday. Thanks to your program's *current date* function, you can easily do just that.

No Date Like the Present

Every data manager can read the current date from your PC's system clock. In *dBASE* and its derivatives (like *Alpha Four*, *FoxPro*, and *Clipper*) the function for doing this is called DATE(), and you would use it in a command like **LIST FOR Deadline <= DATE()**. In the friendlier *dBASE IV* environment, when you create or modify a query, you would type **<=DATE()** in the box below the Deadline heading, then press **<F2>** to get the results. Outside the *dBASE* world, the function has other names: In *Paradox*, it's called TODAY(); in *Q&A*, @DATE. *R:base* doesn't have a function for this job, but its predefined variable #DATE can be used similarly.

Whatever they call their functions, all data management programs let you calculate dates in the same way: When you add or subtract numbers, you add or subtract days. If your Deadline field contains the date 08/20/91, the formula **Deadline – 7** produces the date 08/13/91. And to tell your customers their bills are past due after 30 days, your invoice could include the text **Your bill is delinquent after**, followed by a calculated field that adds 30 to the current date; in *Paradox*, you'd use **TODAY() + 30**.

Weeks, Months, and Years

Want to look at the orders you received in a given calendar year? Most data managers have a function that extracts

dBASE SHORTCUT

A Functional, Formatted Date

Lincoln Spector

Ask *dBASE III* or *IV* or any of their clones what the contents of a date field are, and the answer you'll get back will be something like '08/05/91'; fine for your own information, but not for a report. A combination of date and string functions, however, can make the dates in your reports look just the way you want.

For instance, to print a date like 'Monday, August 5, 1991', you would use the statement **CDOW(***date field***) + ', ' + CMONTH(** *date field***) + ' ' + LTRIM(STR(DAY(** *date field***))) + ', ' + LTRIM(STR(YEAR(***date field***)))** in a calculated field in your report.

That looks horribly complicated until you know how it works. CDOW() reads a date and writes the day of the week; CMONTH() does the same with the month. To get the day's number in a format you can mix with text, use **LTRIM(STR(DAY(***Date field***)))**. The DAY() function reads a date and writes the day of the month as a number, 5 in our example. The STR() function reads a number and writes a 10-digit text string, so the 5 becomes ' 5'. LTRIM() removes the extra blanks, returning the text string '5'. **LTRIM(STR(YEAR(***date field***)))** does the same job for the year.

The full statement may be large, but it gives you a nice-looking date.

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the year from the full date, ignoring the month and day. *dBASE* calls this function YEAR(); typing **YEAR(ORDERDATE) = 1990** in the *dBASE IV* Query Design screen's condition box (brought up with the *Condition Add condition box* option) finds all the orders placed in 1990. *Paradox* calls this function YEAR() too, while in *R:base* it's IYR() and in *Q&A* @YEAR(). Similar functions typically extract the month as a number from 1 to 12, the month as a text string ("August"), the day of the month (in numbers), and the day of the week (as a number or name).

To handle these calculations, your data manager stores dates in a format all its own. If you want to mix a date with standard text—say, to index on Name and Purchase Date together, or to include a date in a sentence—you'll need to convert the date to a text string first. Most data managers have a function for this. In *dBASE* the function is called DTOC(), for Date To Character; if you've stored dates in a field called Sale-Date, the command **? "This item was sold to you on " + DTOC(Sale-Date)** displays a statement like 'This item was sold to you on 08/05/91.'

When you define a data base in Q&A, you can pick one of 20 date formats. In reports, you can modify the look further using functions in a calculated field.

But that's not the nicest way to display a date. What if you prefer to say 'This item was sold on Monday, August 5, 1991'? Printing a proper-looking date in *dBASE* involves a complicated statement with functions inside of functions (see the sidebar "dBASE Shortcut"). Luckily, other programs offer simpler ways to do this; *Q&A*, for instance, lets you select from a wide range of data formats—from 8/5/91 to 5.08.1991 to August 5, 1991—when you define your data base. However, you'll still need to use a few functions to get Monday, August 5, 1991.

Date functions are useful tools for focusing on the information you really want in your data base. Don't overlook their power.

Steve Cummings is the author of Understanding Quicken *(Sybex, Alameda, California, 1990) and a* PC World *contributing editor. Celeste Robinson is the author of* The Best Book of Paradox *(Howard W. Sams and Co., Carmel, Indiana, 1990). Lincoln Spector is a* PC World *assistant editor.*

PARADOX SHORTCUT

Monthly Summaries

Celeste Robinson

Reports, particularly annual ones, are often divided by month. A report of last year's sales, for instance, might contain a subtotal for each month. Luckily, the *Paradox* report generator makes displaying a monthly subtotal easy.

Enter the report generator, and arrange your fields in a Form or Table band as you would for any other report. To create another band for the subtotals, press **<F10>** and select *Group Insert Range.* A menu bar will display the fields in your table; select the date field. You'll next be prompted to group by Day, Week, Month, or Year; select *Month.*

Next, you must place the new band. Move the cursor into the Page band above or below the form band and press **<Enter>**. You now have a new band that prints whenever the month in your date field changes. To place monthly sales subtotals in this band, move the cursor into the band, press **<F10>**, and select *Field Place Summary Regular.* Select your Sales Amount field, then *Sum PerGroup.* When you print your report, your sales will be grouped, and totaled, by month.

The Art of Persuasion

Publishing & Graphics

Expert advice for creating high-impact documents and presentations

This month: creating color presentations, and speeding chart redraws in Freelance

Richard Jantz

Unless you're Woody Allen, putting out your message in black-and-white puts you at a disadvantage. Color helps get your point across more quickly and effectively—a color pie chart is far easier to grasp than one using gray shades or cross-hatching. But choosing the right colors for your overheads or 35mm slides is a lot trickier than flipping open a box of Crayolas.

It's no secret that different colors produce different moods and effects, and that some color combinations look better than others. Top presentation programs like Software Publishing's *Harvard Graphics* and Microsoft's *PowerPoint* provide predesigned *color schemes*—sets of coordinated hues for backgrounds, text, borders, and such elements as the bars in a bar chart. But they don't tell you which scheme is appropriate for a particular type of presentation or help you create attractive custom color schemes to make your message stand apart from the crowd.

This month we discuss the art of mixing and matching colors to produce effective presentations. For a handy visual guide to colors that work well together, take a peek at the *color wheel* shown in **FIGURE 1**. Then follow these simple guidelines to choose the right colors for your slides, overheads, and on-screen presentations.

- Choose colors that play a meaningful part in your message, such as those used in your company's logo or product packaging. On the other hand, if you're presenting a bid to, say, Kodak, you may want a color scheme that goes well with that company's yellow-and-red logo.
- Choose colors that reflect the emotional mood of your presentation. For a serious business discussion, use *cool* colors—shades of green, blue, or violet—to evoke a sense of trust. If you're launching a new product line, *warm* colors like red, orange, and yellow help generate excitement.
- Use a consistent color scheme throughout your presentation. If you incorporate existing slides in your presentation, make sure the color schemes match.
- Adjust the color scheme to match

Wheel of Color

FIGURE 1: Color wheels like this have been around for centuries, and they're still useful for choosing colors that don't clash. Colors that are adjacent or opposite provide harmonious color combinations. By changing the lightness and intensity of the colors shown, you can produce millions of additional hues.

your output medium. For example, dark backgrounds and light text work great for color slides and screen shows, but you'll want light backgrounds and dark text for overheads.

- Avoid using too many colors or color contrasts in a chart. Although some programs offer as many as 16 hues per color scheme, the most effective charts use only 4 or 5. If you must add more—say, to represent a dozen bars in a bar chart—use light, medium, and dark versions of a small set of hues.
- Use the color wheel to select harmonious color combinations. To create subtle contrasts (for example, between the shaded areas of a 3-D chart), pick colors that are adjacent on the color wheel. For striking contrasts—to set off the most important part of a chart—choose colors from opposite sides of the wheel.
- If you add color clip art (such as a logo) or scanned images to a slide, make sure the image's colors don't clash with or blend into the other colors in your chart. A picture of the United States flag may add a patriotic touch to a chart, but it won't show up well against a dark blue or red background.
- Avoid using red and green shades to display chart data such as the different sections in an area chart. If members of your audience are color-blind—as are from 6 to 10 percent of the male population—they'll have trouble distinguishing between the red and green sections.

Finally, if color presentations play a starring role in your job, consider adding a color reference book to your library. Two good resources are *The Power of Color in Design for Desktop Publishing* (MIS Press, Portland, Oregon, 1990) and *Color Harmony: A Guide to Creative Color Combinations* (Rockport Publishers, Rockport, Massachusetts, 1987). ●

PC World *contributing editor Richard Jantz is the author of* Ventura for Windows 3.0 *(John Wiley & Sons, New York, 1991).*

DESKTOP PRESENTATIONS TOOLBOX

Clear and Easy Color Transparencies

So you want to print your overheads in living color, but your budget is strictly black and white? Leave the color marking pens and color adhesive film in your desk drawer—now there's an easier way to add a splash of color to those lackluster monochrome transparencies.

3M's Laser Printer Film and Avery's ColorFrames add the color to the transparency *before* you print it. Simply place the transparencies in your laser and print as normal. On 3M's color transparencies, your text and data charts show up crisply against a light-blue or light-yellow background, whereas Avery's clear transparencies surround your charts with bright blue, green, or red borders. These products cost the same per page as regular transparencies and can be found at most office supply stores. Pick either one to add a dash of color to your next presentation.

Avery ColorFrames (50 sheets) $32; Avery Commercial Products Division, 818 Oak Park Rd., Covina, CA 91724; 800/541-5507
Reader service no. 616

3M Laser Printer Film (50 sheets) $26; Visual Systems Division, 3M Austin Center, Austin, TX 78769-2963; 800/328-1371
Reader service no. 617

NUTS & BOLTS

Fast Chart Redraws in Freelance

If you use *Freelance Plus*'s drawing tools to enhance your presentation charts, you know how annoying it is to wait for the screen to redraw. The screen refreshes every time you use the View command to change page views and whenever you return to the current page after using the Print Preview command.

Fortunately, there are ways to speed things up. First, you don't have to wait for *Freelance* to redraw the screen completely. By pressing <Esc> or the right mouse button, you can stop redrawing the screen whenever you want. Second, *Freelance* redraws objects faster if you first turn off the highlight indicators (small squares that identify a selected object). Just press <F8> or use the Options Highlight command to conceal the indicators before the screen redraws.

Finally, you can always move part of a complex drawing to *Freelance*'s alternate work space ('Page 2 of 2') while editing, and then move it back to the current page when done. It takes less time for the screen to redraw only part of an image.

Windows Workshop

Windows

Practical advice on mastering Windows 3.0

This month: Learn to tune up WIN.INI.

Jesse Berst and Scott Dunn

Model T owners had to be part mechanic to keep their tin lizzies going. It's not that bad for *Windows* users, but knowing what goes on in WIN.INI, a key part of the *Windows* engine, doesn't hurt.

WIN.INI is an initialization file, a sort of combined AUTOEXEC.BAT and CONFIG.SYS that tells *Windows* and its applications at start-up how the environment is configured, where resources like printers are, and more. If you just need basic transportation, you won't have to dig into WIN.INI, since many of its functions can be managed from the *Windows* Control Panel. But if you want to auto-load programs, fine-tune performance, run *Windows* on a network, or otherwise customize the environment, this is where you start (for a guide to WIN.INI functions and settings and how they relate to Control Panel options, see the figure).

Checking Under the Hood

Since WIN.INI is an ASCII file, you can edit it with any text processor. Or if you double-click WIN.INI in *Windows'* File Manager, it will automatically be loaded in the Notepad.

Poke around, and you'll see that WIN.INI is divided into sections, each with a heading in square brackets. Many of these sections correspond to Control Panel icons. Applications like *Excel* also add sections during installation that specify where a program finds its fonts, dictionaries, and so on.

In each section are statements in the format *function=value*. The value (words or numbers) represents the function's setting. For instance, Spooler=yes tells *Windows* to use Print Manager whenever a *Windows* application prints a file.

Let's Do Launch

One simple modification you can make to streamline operations is having WIN.INI launch one or more programs every time you run *Windows*.

First, make a backup of WIN.INI. Then open WIN.INI, and at the top of the [windows] section, locate the run= and load= statements. To run a program automatically, type in its full path and executable file name after run=. To load one as an icon on the desktop, use the load= line. To start multiple programs, separate the names with either a *single* space or a comma—but not both. The limit per line is 127 characters.

For example, if you wanted WIN.INI to automatically put *PageMaker 4.0*'s icon on the desktop and open *Excel* and *Windows'* Clock utility, you'd set up the file as follows:

load=c:\pm4\pm4.exe
run=c:\excel\excel.exe clock.exe

This trick also works for a DOS program. Simply type in its path and either its executable file name or the name of

WINDOWS SHORTCUT

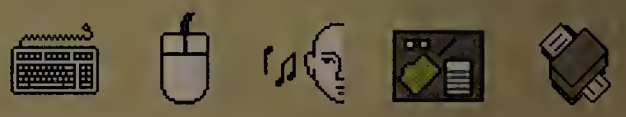
Save Those Program Groups!

Setting up *Windows* so that everything—applications, desktop colors, fonts, and so on—is just the way you want it can take some time. Don't let a system crash, or even the installation of a new *Windows* application, destroy your work. Religiously back up all initialization (INI) files, especially WIN.INI and SYSTEM.INI. When fate strikes, you can restore your backup copies to *Windows'* subdirectory and save yourself a lot of trouble.

Don't forget to back up PROGMAN.INI too. This file stores the configuration of all the program groups you have laboriously crafted. Just remember that it doesn't include the actual group files (with the extension GRP). If a crash destroys any GRP files, restoring PROGMAN.INI won't help much—you'll still have to re-create each group from scratch. So be doubly safe and back up all the GRP files as well. In the event of a disaster, you'll be prepared.

WIN.INI Starts Windows the Way You Want It

Here's a guide to the major sections of WIN.INI, Windows' customizable start-up file.

Section name	Function	Primary control point
[windows]	Settings for many customizing features, including automatic program launching; window border width; speed of keyboard, mouse click, and cursor blink; beep options; program extensions; and various network and printer specifications	Various Control Panel functions 
[desktop]	Settings for wallpaper, desktop pattern, and grid for placing windows and icons	Control Panel, Desktop icon
[extensions]	List of file name extensions associated with applications	File Manager, Associate command
[ports]	Settings for communications and printer ports and for printing file to disk	Control Panel, Ports icon
[fonts]	List of installed FON-format screen fonts	Control Panel, Fonts icon
[PrinterPorts]	List of active and inactive installed printers, including port assignments and time-out settings	Control Panel, Printers icon
[devices]	List of available printers, similar to [PrinterPorts] list but without the time-out settings; used only by Windows 2.x applications	Control Panel, Printers icon
[colors]	List of RGB values that determine the color of various portions of the Windows interface	Control Panel, Color icon

the program's PIF file. Note: If two or more full-screen DOS applications are listed on the run= line, only the last one will open full screen.

Auto-Opening Data Files

Automatically opening a specific data file into a *Windows* or DOS application is almost as easy to do. The first trick is associating the file's extension with the application; the second trick is listing the data file (*not* the application) after the run= or load= statement.

The easiest way to associate a file's extension is by running the File Manager. If you want to associate a TXT file, for example, open a directory window and select *any* data file with the TXT extension, then open the File menu and pick the *Associate* command. In the dialog box, type in the executable file name of the program you want to associate the data file with (such as **C:\WINDOWS\WRITE.EXE**), and press **<Enter>**.

If you need to associate more than one file extension with a program, you can do it faster by opening WIN.INI and going to the [extensions] section. The statements here follow the format *nnn=program.exe ^.nnn*, where *nnn* is the data file's extension and *program.exe* the name and path of the executable program file.

For example, to associate all TXT files with *Windows Write*, you'd type

txt=c:\windows\write.exe ^.txt

(A side benefit: Once you've associated the TXT extension with *Write*, double-clicking any TXT file in the File Manager will force *Write* to load it.)

When you've made the necessary file associations, you can finish creating an auto-loading file. Go back to the run= or load= line and type in the name of the desired data file. For example, to load TODO.TXT into *Write* automatically when you start *Windows*, type

run=c:\windows\todo.txt

Save WIN.INI, restart *Windows*, and you're in business.

You've learned the basics—stay tuned next month for some advanced WIN.INI tinkering, including automatic font downloading.

Jesse Berst is a contributing editor for PC World. *He and Scott Dunn are coauthors of* 101 Windows Tips *(Peachpit Press, Berkeley, California, 1991).*

The Information Edge

Communications

On-line resources for business and professional users

This month: Find out if Dow Jones News/Retrieval is worth the price, and discover another way of legal networking via the Electronic Bar Association Network.

Judy Heim

Dow Jones News/Retrieval (DJN/R) is a comprehensive on-line source of business information, offering up-to-the-minute stock quotes along with access to the full text of 350 business newspapers and magazines. Its only flaw is sky-high pricing. Dow starts at $7.60 an hour (300 baud at night), but when you add daytime access fees, surcharges for certain services, and a nasty per-character charge, you can end up paying $171 per hour—plus an $18 annual service fee. Some surcharges are lower, but most of the useful features hover uncomfortably close to that $171 price point.

Q. *What's available on Dow Jones News/Retrieval?*

A. DJN/R consists of four main data bases:

- Business and World Newswires holds the Dow Jones business news wires, plus the *Wall Street Journal*, *Barron's*, and Japan's Kyodo news wire.
- Dow Jones Text Library contains the full text of 350 national and regional business publications.
- Company/Industry Information offers a wide range of data—including earnings forecasts, company reports, and analysts' reports—on all publicly traded companies in the world.
- Quotes, Statistics, and Commentary delivers current and historical stock quotes as well as mutual fund reports.

Best of all, DJN/R is easier to search than a newspaper stock quote listing. You can choose a fast command-line interface or well-designed menus. To search the full text of news wire and publication holdings, simply enter the words you want to search for, and (if you like) a date range. Dow checks its files and returns a list of headlines. Once you select those that interest you, full text scrolls across the screen.

Q. *What does DJN/R offer that you can't get anywhere else?*

A. It's the only on-line source for the four Business and World Newswires, plus full text of the *Wall Street Journal*, *Barron's*, *Business & Finance Report*, and *American Demographics*. Also exclusive: transcriptions of the TV show *Wall $treet Week* and up-to-the-minute reports on SEC filings. But Dow's main draw is its up-to-the-second stock quotes. CompuServe, GEnie, and Prodigy also offer stock quotes, and for a lot less, but only with a 15-minute delay.

Q. *Can I find any of the nonexclusive information on DJN/R elsewhere for less?*

A. Yes, indeed. GEnie offers daily and historical stock prices for just $4.95 a month, if you log on at night.

CompuServe (CIS) offers a variety of useful financial features. For instance, Rategram lets you search for securities and certificates of deposit with the highest return, and several other features make it easy to analyze your investment portfolio. CIS also offers Vestor Buy/

ON-LINE SHORTCUT

Choosing the Fastest Error Correction Protocol

If you're downloading files from CompuServe, always use its proprietary error-checking protocol, CompuServe-B. This protocol is really fast, mainly because of its large block size and because it doesn't pause between blocks for an acknowledgement. On other on-line services, YMODEM or ZMODEM are your best choices. The former gains speed thanks to the large blocks in which it sends data; the latter sends information in highly efficient data streams instead of blocks (but falls back to block format if it encounters line noise).

Sell Recommendations and Money Magazine's Info Center.

Basic hourly charges on CIS range from $6 to $12.80, plus $2 per month. True, some CIS features have surcharges, but they are generally much lower than you'll find on DJN/R. For example, Money Magazine's FundWatch Online actually offers more details than you'll find on DJN/R, and it costs only $21 to $27.50 an hour. On DJN/R you pay $36 to $171 an hour, plus per-character charges.

Q. *Will DJN/R track news on particular companies that interest me?*

A. You bet—if you're willing to pay the price. DJN/R's clipping feature, which also costs $171 an hour (2400 baud during the day), lets you create up to ten folders with five search phrases in each. It culls all appropriate news from the DJN/R news wires; then every time you log on, the scoop is waiting for you. DJN/R's tracking feature lets you keep tabs on stock prices as well as breaking news on 25 companies or industries—and it costs the same $171 an hour plus an additional $82 a month. But remember, almost every on-line service, including CompuServe, GEnie, and NewsNet, offers similar capabilities for a whole lot less.

Q. *If I decide DJN/R is worthwhile for my business, how can I keep my bills down?*

A. Log on after hours. DJN/R's evening rates and surcharges are dramatically lower than its day rates. And invest in a 2400-baud modem (the fastest DJN/R supports), which lowers your bit-per-second cost. That way if you really need up-to-the-second quotes and other exclusive goodies from DJN/R, you'll know you're getting them at the best possible price. ●

Judy Heim is a contributing editor for PC World. *Nick Kees is an intellectual property lawyer in Milwaukee specializing in software and electronics.*

For more information about all services in this article, circle reader service no. 901.

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Rockville, MD 20850
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THE PROFESSIONAL EDGE

Electronic Bar Offers Lawyers an On-Line Alternative

Nick Kees

If your legal firm is counting pennies, or if you're a law student who can't yet afford to fly first class, check out a new low-cost on-line service for lawyers: the Electronic Bar Association Network.

Like the better-known ABA/net, EBA/net offers on-line conferences, E-mail, legal forms, and access to research data bases. Unfortunately, EBA/net is somewhat underpowered. Its message conferences are sparse, and you can't send E-mail to outside services. Since it has fewer members, opportunities for networking are thin too. And while the price is low, it's not *that* low.

Still, EBA/net is only a few steps behind ABA/Net. Its access to essential data bases like Lexis/Nexis, Dialog, BRS, Vu/Text, and NewsNet is just as strong. And you'll find more than 900 legal forms—including promissory notes, contracts, bankruptcy forms, corporation forms, and litigation-related forms—in the format of every leading word processor. The forms are available on ABA/net too, but only uncompressed—and costing $400 per hour at 2400 baud. EBA/net offers compressed ZIP files at no extra cost. And if you're looking for on-line access to the popular *Law MUG Newsletter,* you'll find it here, exclusively.

A subscription to EBA/net is $10 per month, plus hourly charges that range from $11 to $17. ABA/net's hourly charges are about the same—but while there's no monthly charge, you're stuck with a $30 monthly minimum and hefty surcharges. For very small firms, especially those that don't need to be on line every day, EBA/net's cost savings will be welcome. But most legal outfits will probably be happier with ABA/net with its bigger subscribership and wider choice of forums.

EBA/net Electronic Bar Association Legal Information Network, P.O. Box 11191, Chicago, IL 60611-0191, 312/951-8451
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User Group Tips

Helpful hints from members of the nation's user groups

Around the Block Again With WordPerfect

Tired of running around the block in *WordPerfect* every time you need to make more than one change to a section of text? There's an easy way to avoid manual reblocking after boldfacing, underlining, or moving text. Once you have marked the original block and, say, underlined the text, just press **<F12>** or **<Alt>-<F4>**, and then press **<Ctrl>-<Home>** twice. The block will be rehighlighted, and your cursor will snap back to where you began the block.

Thomas M. Taulli
Pasadena IBM Users Group

Mouseless Ami Pro Word Deletes

Windows word processing jocks get so accustomed to using a mouse, they sometimes overlook more efficient keyboard solutions. Sure, it's great to be able to delete large blocks by highlighting with the mouse and pressing <Delete>. But when you have to remove a number of single words in one section of a document, this method can actually slow you down. It's often easier to jump the cursor a word at a time with **<Ctrl>-<Cursor Right>** or **<Ctrl>-<Cursor Left>**, a sentence to the right with **<Ctrl>-<Period>**, or a sentence to the left with **<Ctrl>-<Comma>**. Place the cursor on the first character of the word you want deleted, and use **<Ctrl>-<Shift>-<Delete>** to clip the word with any trailing spaces. You'll get the job done quickly while keeping your hands on the keyboard.

Ronald Ogg
Diablo Valley PC Users Group

Copy AUTOEXEC.BAT for Protection

If your system starts misbehaving, check AUTOEXEC.BAT—the file in your root directory that initializes your system when you boot up. Software you've recently installed may have changed it. If you're on a LAN, for example, adding a PATH command to the end of your AUTOEXEC.BAT may wipe out the network drive mapping, preventing you from working with the LAN as you're used to. Other changes can be more subtle; some programs don't even let you know they're making them. If you're like most users and have only a nodding acquaintance with your AUTOEXEC.BAT, it can be hard to spot changes.

Right now, while everything is working the way you want, archive a copy of AUTOEXEC.BAT. You should have a separate \DOS directory for all DOS files on the C: drive of your hard disk. Enter **copy c:\autoexec.bat c:\dos**. Then, if you experience problems with your system, enter **comp c:\autoexec.bat c:\dos**. If the two files are different, print them to see what's changed in the new one.

If you can't spot an obvious troublemaker, use an ASCII editor to remove all the new lines except the first. Reboot, and if everything works all right, add another line and boot again. Repeat the process until you have identified the problem instruction. Remove the offending line, and call the software vendor's technical support to help find a work-around that will let you use the program in your environment.

Charles Suitt
North Texas PC Users Group

A Neat Wrap-Up for Long Text Fields in Paradox Reports

If your *Paradox* tables have fields from 80 to 255 characters in length, you can't show their contents in single lines on a standard screen or in a letter-width report. But you can use WordWrap in the *Paradox* report generator to print long fields out on a few neat lines.

Press **rd*** **<Enter>** and select the name of the table. Highlight the number of an unused report, press **<Enter>**, type a description, and press **f** to design a free-form report. You'll see a design screen containing every field in the table in a vertical column. Delete any elements you don't want: Press **fe** and place the cursor on fields you want to erase; you can remove nonhighlighted text elements if you like, with **<Backspace>** and **<Delete>**.

Press **<F10>fp** and select the field type; you'll bring up a list of the fields of that type in the table. Select the field you want to wrap, and cursor to where you want to start. Press **<Enter>**; the cursor will go to the right end of the line. Hold down **<Cursor Left>** to move to where you want the right margin. Press **<Enter><F10>fw**, and press **<Enter>**. Answer the prompt and enter the number of lines sufficient to display the contents of the field. A notice will appear at bottom right letting you know the word wrap value has been recorded. Select any other fields you want to include in the report, and then take a look at the output: Press **<F10>o** and select *Printer, Screen,* or *File* for your report. You'll get clean, professional results.

Steve Feldman
Twin Cities PC User Group

Are you a user group member with a tip to share? Send it to User Group Tips, PC World, *501 Second St. #600, San Francisco, CA 94107; CompuServe 74055,412; MCI Mail PC World Editorial; or 415/442-1891 (fax)—include your phone number. We pay $50 and throw in a* PC World *T-shirt for each tip we use—and you get to see your name in* PC World.

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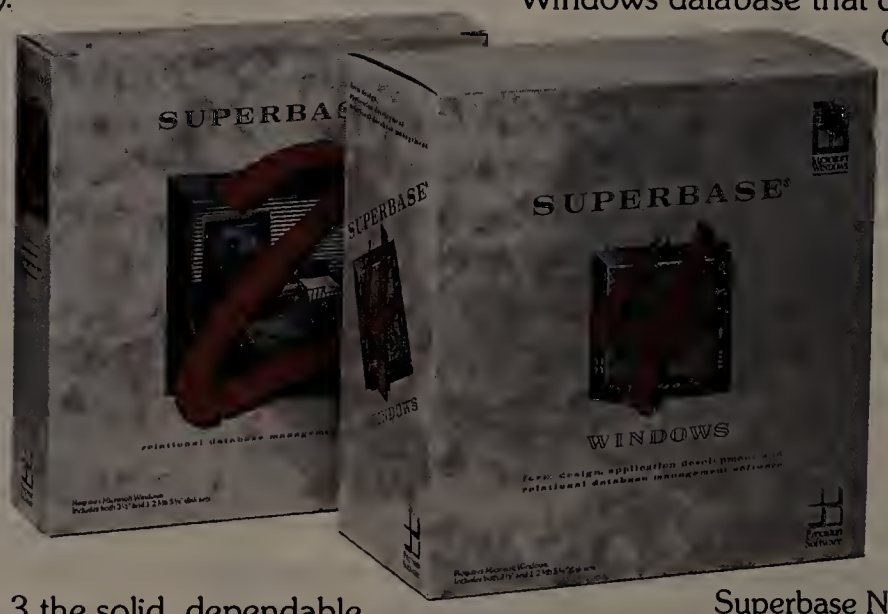

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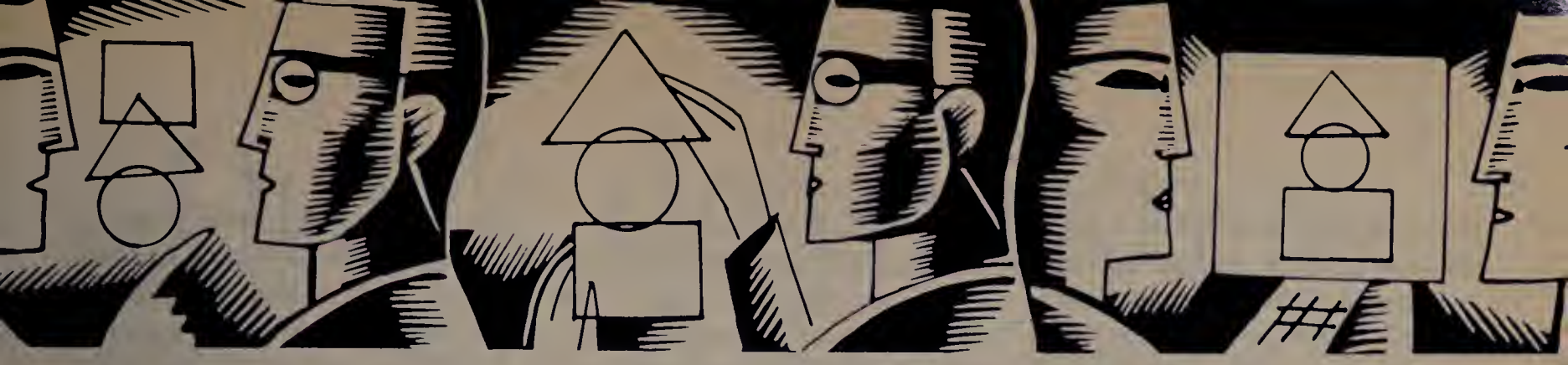


STAR-DOT-STAR *.*

A global exchange of personal computer discoveries

List available memory and disk space fast and in color, shrink your Q&A and ThinkTank data bases, delete multiple files in one swell foop, check your 1-2-3 errors at the door, and read about DOS and assembly.

Edited by Brett Glass

To Boldly Go Where CHKDSK Can't

Every time I use CHKDSK.COM, I want it to tell me just two things: how much space is left on my disk and how much memory is free. On a fast machine this information comes quickly, but on an early PC or one with a slow hard disk, the wait can be intolerable. This problem led me to develop Freespace (FS.COM). It's many times faster than CHKDSK, produces a clearer display (in color on most machines), and needs less than 4K of RAM, as opposed to CHKDSK's 40K.

I've tested Freespace on 8088s, 80286s, and 80386s using DOS 3.0 to 3.3. To use it, type **fs** *d:* where *d:* is any valid drive. If you type just **fs**, the program uses the default drive.

Brian Mowers
Southfield, Michigan

Editor's note: Mr. Mowers doesn't mention one of the best applications for his program: networked drives, where CHKDSK, which needs exclusive access to the physical drive, doesn't work at all. I altered his original code to let the program work on disks larger than 64MB and to fix a few minor bugs.

To create the program, type the seemingly senseless text in **LISTING 1** *into an ASCII text file called FS.DAT. Double-check the code for errors. At the DOS prompt, type* **debug<fs.dat** *to create your FS.COM program file, which you should then move to a directory listed in your PATH command.*

If you compare FS.COM's memory estimate to CHKDSK's, you'll see that it's more conservative. The reason: CHKDSK adds back its environment space and FS doesn't. FS's number is probably closer to the actual amount of memory a program will have available when it runs.

Slim Down Your Symantec Data Base Files

Surprise! Your disk is just as crowded

(continues)

```
N MF.COM
E 0100 FC 33 D2 BE 80 00 AC 0A C0 74 08 46 AC 24 5F 2C
E 0110 40 8A D0 B4 36 CD 21 3D FF FF 75 09 BA 2E 02 B4
E 0120 09 CD 21 EB 52 BE 23 02 F7 E1 F7 E3 B9 0A 00 D1
E 0130 EA D1 D8 E2 FA 8B 10 27 F7 F3 8B F8 8B C2 B9 04
E 0140 00 E8 8A 00 8B C7 B9 03 00 E8 82 00 BE 1B 02 B9
E 0150 08 00 E8 8F 00 BA 0A 02 B4 09 CD 21 B4 03 CD 10
E 0160 BD 1B 02 B8 01 13 BB 4F 00 B9 09 00 B2 11 CD 10
E 0170 BA 25 02 B4 09 CD 21 2E A1 02 00 8C CB 2B C3 B9
E 0180 10 00 F7 E1 BE 02 02 B9 04 00 73 3C BB 10 27 F7
E 0190 F3 8B F8 8B C2 E8 36 00 8B C7 B9 02 00 E8 2E 00
E 01A0 BE FC 01 B9 06 00 E8 3B 00 BA F0 01 B4 09 CD 21
E 01B0 B4 03 CD 10 BD FC 01 B8 01 13 BB 4F 00 B9 07 00
E 01C0 B2 2E CD 10 B4 4C CD 21 41 E8 02 00 EB D2 BB 0A
E 01D0 00 33 D2 F7 F3 80 CA 30 88 14 4E 80 3C 2C 75 01
E 01E0 4E E2 EE C3 80 3C 30 77 06 C6 04 20 46 E2 F5 C3
E 01F0 DE 20 46 72 65 65 20 52 61 6D 3A 20 20 20 20 2C
E 0200 20 20 20 20 62 79 74 65 73 24 46 72 65 65 20 44
E 0210 69 73 6B 20 53 70 61 63 65 3A 20 20 2C 20 20 20
E 0220 2C 20 20 20 24 20 4B 20 62 79 74 65 73 24 07 20
E 0230 2A 2A 2A 20 44 72 69 76 65 20 6C 65 74 74 65 72
E 0240 20 69 73 20 69 6E 76 61 6C 69 64 20 2A 2A 2A 20
E 0250 20 24
RCX
0152
W
Q
```

LISTING 1: This file, FS.DAT, contains DEBUG keytrokes to create FS.COM, a speedy utility that displays free disk space and RAM.

ANTHONY RUSSO

after you delete records from a *Q&A* data base as before. For instance, I had an employee information data base named PERSON with 440 records in it. A directory listing showed a 675K DTF file and a 343K IDX file. After using *Q&A*'s *File Remove* command to remove all but 20 of the entries, as far as DOS was concerned I still had nearly 1MB tied up in those files.

To remedy this problem, copy the contents of your old data files to new ones, then rename the new ones: After deleting a large number of records, select *File Copy Copy design with IA info* from the *Q&A* main menu, and call your new files something like PERSON2. Next, select *File Copy Copy selected forms*. Press <F10> twice to copy all the nondeleted records in the data base; the new DTF and IDX files will be considerably smaller. You may now use DOS to delete the original files and rename the new ones.

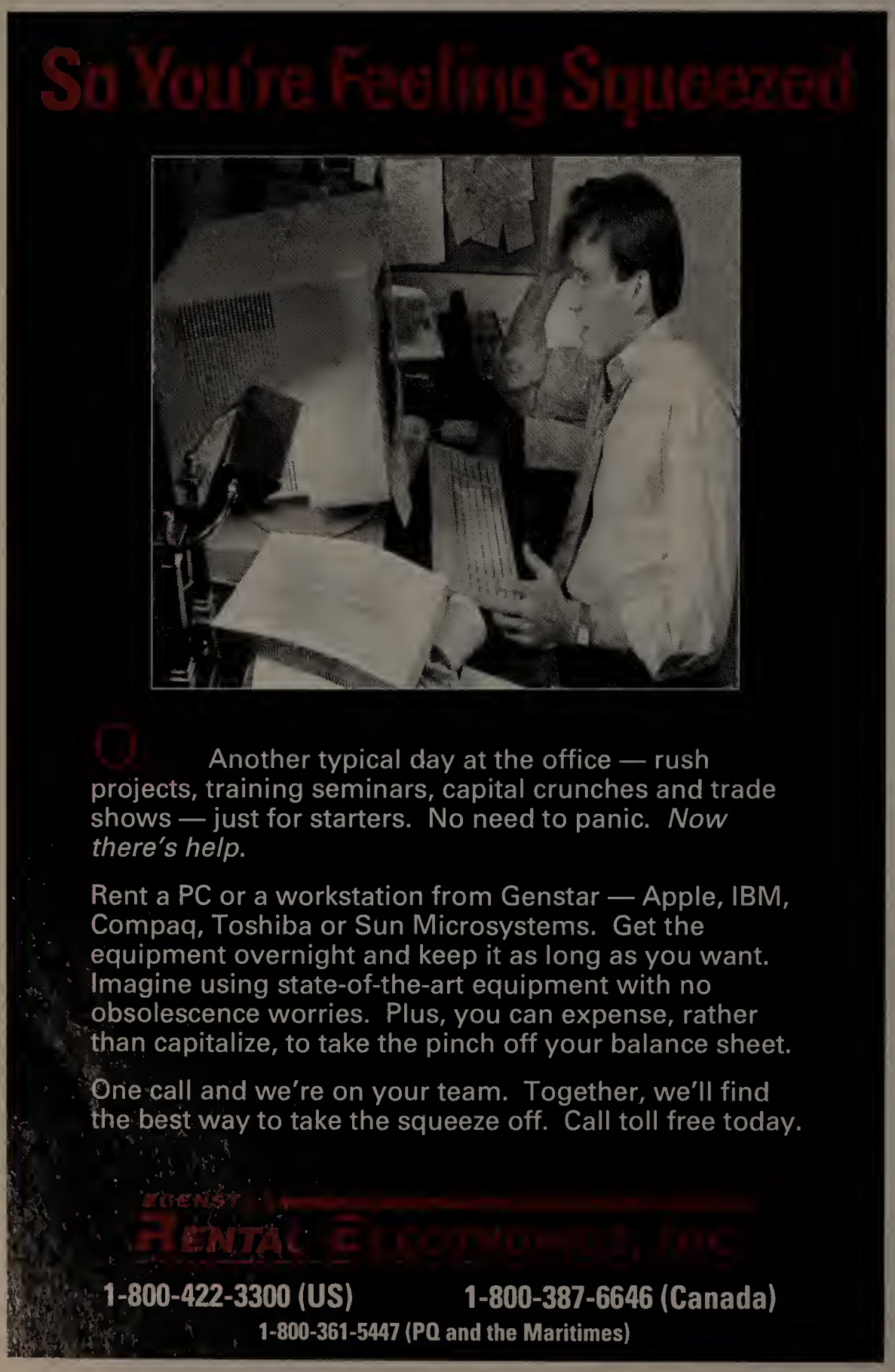
Emmett A. Dulaney
Fort Wayne, Indiana

Editor's note: Q&A *isn't the only Symantec product with this problem. No matter how many headlines and documents you delete from a* ThinkTank *outline file, it stays at the largest size it's ever been. The solution for* ThinkTank *is similar to the one for* Q&A: *Write the contents to a file (in* ThinkTank*'s case, a "structured" file), then create a new data base, and read the data back in using the* Port Text Receive Wordprocessor *command. Other products, such as Borland's* Reflex, *pack their data bases on command, making these measures unnecessary.*

Delete Tall Heaps of Files in a Single Bound

I use UNIX as well as DOS, and I prefer

(continues)



POWER TIP NO. 198

Setting Date Formats in Worksheet Headers and Footers

To print the current date in your *1-2-3* or *Quattro Pro* worksheet, place @ in the header or footer. The format of the printed date is determined by the format you select for the clock display on the status line. You can reset the date's format with */Options¦Other¦Clock* in *Quattro Pro* or */Worksheet Global Default Other Clock* in *1-2-3*.

Robert J. Sandler
New Milford, New Jersey

Quick, do you know the first name in microprocessors?

_____ 486™

_____ 386

_____ 386SX™

its RM (remove) command to DOS's DEL and ERASE as a way of deleting files. RM lets you delete many files by specifying them all in one command line, such as **rm fhm.* *.doc *.dat test.drw *.dwg**, something DEL could never dream of. To bring this old UNIX friend into the DOS world, I developed a batch file, RM.BAT [see **LISTING 2**]. Put this file in a directory on your path, and you can delete up to nine files or wild-card file groups. Note that if you're using an earlier version of DOS than 3.1, you need to remove the @ sign at the beginning of the 'Echo off' command in this file.

Faheem Ahmad
Blacksburg, Virginia

```
@echo off
if "%1"=="" goto MSG
if "%1"=="/?" goto MSG
:START
if "%1"=="" goto END
erase  %1
shift
goto START
:MSG
echo Deletes the files listed
echo on the command line.
echo Wildcards are allowed.
echo RM file [file [file...]]
:END
echo on
```

LISTING 2: RM.BAT deletes lists of filespecs (each of which may contain wild cards) in one swell foop.

Editor's note: This batch file is an excellent demonstration of the DOS SHIFT command, which "steps" through a list of batch file arguments so %2 becomes %1 and %3 becomes %2, allowing you to process up to nine parameters in a loop. The OS/2 shell's ERASE and DEL commands already allow multiple file specs, but Microsoft hasn't added them to DOS for fear of creating incompatibilities.

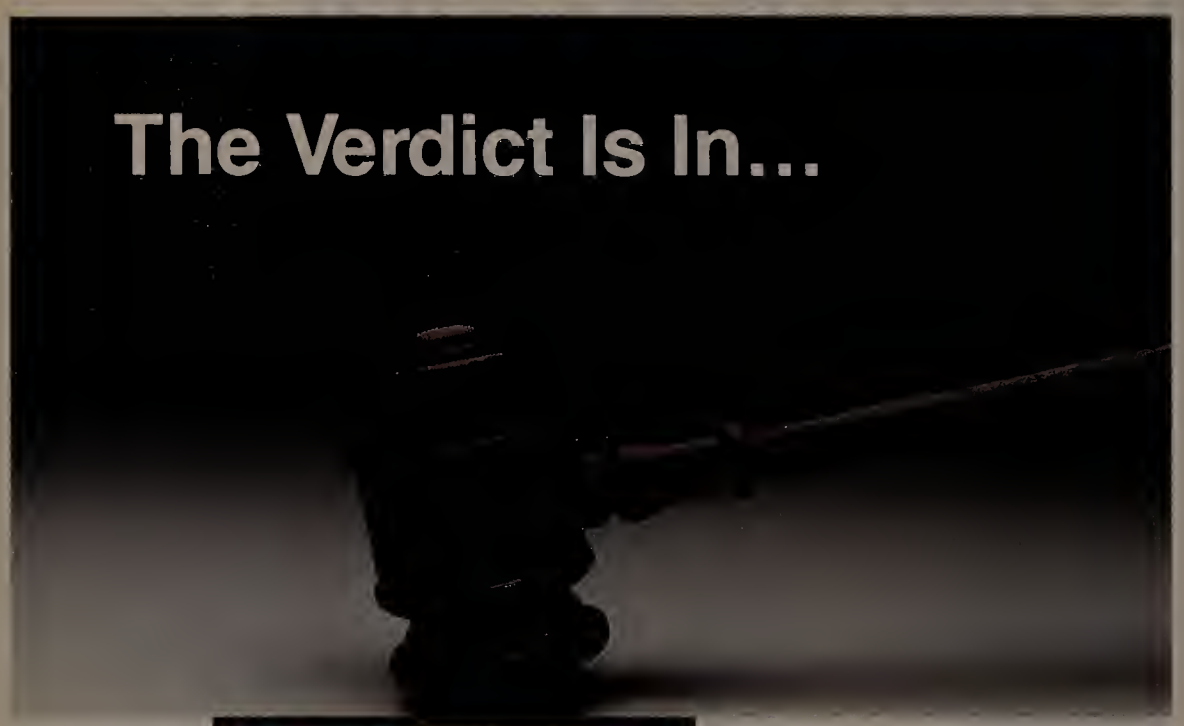
To ERR Is Electronic

In a *1-2-3* worksheet, I have to calculate the difference between two numbers as a percentage of the second one. I used to do this with the formula (B12-C12)/C12. But if cell C12 was empty, which it was if I hadn't yet typed a value, the formula produced an ERR value. That didn't suit me; if C12 was blank, I wanted the cell with the formula to be blank as well.

To solve the problem, I replaced the formula with a new one, **@IF(@ISERR((B12-C12)/C12),"",(B12-C12)/C12)**, which leaves the formula cell blank if C12 is empty. The @ISERR function evaluates the original formula and returns a true value if the result is ERR. @IF puts a blank in the cell if @ISERR is true or does the calculation again if @ISERR is false.

Robert Siegel
Vienna, Virginia

(continues)



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PC WORLD

Instant Reference Card #15

For use with PC World Instant Reference Card Portfolio

BASICS: DOS 5.0

How it works: When you start your PC, DOS's command processor, COMMAND.COM, starts automatically. This program brings DOS's internal commands into memory ready for you to run by typing their names at the DOS command line or prompt. Commonly used internal commands include CD, COPY, DEL, DIR, MD, and RD. In addition, DOS provides external commands, each with its own executable file, which you should store in a directory named \DOS on your hard disk. These files have EXE or COM extensions, for example, CHKDSK.COM, COMP.COM, and XCOPY.EXE. A BAT, or batch, file is a text file in which you list a sequence of commands, each an its own line. If named AUTOEXEC.BAT and stored in the root directory of the boot drive (A: or C:), it executes automatically whenever you start your PC.

ENTERING DOS COMMANDS

You can run an internal command (and any file with an EXE, COM, or BAT extension) by typing its name (without the extension) and pressing **<Enter>**. You can define some commands more specifically with the use of *switches*—characters or words that follow a command, often separated from it by a forward slash (/). DOS provides the following command line options:

Don't execute the command	**<Esc>**
Pause a command	**<Ctrl>-S** or **<Pause>**
Stop a command	**<Ctrl>-C** or **<Ctrl>-<Break>**

Fold Here

DOS also enables you to edit and reuse the last command entered.

Copy one character at a time	**<F1>** or **<Cursor Right>**
Copy up to a character	**<F2>***character*
Copy all remaining characters	**<F3>**
Delete up to a character	**<F4>***character*
Edit a command without executing	**<F5>**

NAVIGATING YOUR HARD DISK

If an external command is not in the default directory of the default drive, you can either prefix the command with its drive and/or directory path, or change to that directory and then issue the command. An alternative to these methods for commonly used commands is to issue a PATH command that lists their directories.

Give DOS a list of directories to search for commands	**PATH=***C:\DOS;C:\BATCH;C:\123*
Make DOS prompt display the default directory	**PROMPT PG**
List a directory's files and subdirectories	**DIR** *C:\DIR1*
List them in five columns, one screen at a time	**DIR** *C:\DIR1* **/W /P**
List files with an EXE extension in the default directory of the default drive	**DIR *.EXE**

Note: The asterisk, or star (*), represents any number of characters; the question mark (?), only one. You can use definite characters in conjunction with wild cards (e.g., R???.EXE, R*.*) to be more specific.

Change to drive A:	**A:**
Change the default directory	**CD** *C:\DIR1\DIR2*
Create a new directory	**MD** *C:\DIR1\NEWDIRECTORY*
Remove a directory	**RD** *C:\DIR1\OLDDIRECTORY*

Note: You can't remove a drive's root directory (e.g., A:\), the directory you're in when you issue the RD command, or a directory containing files or subdirectories.

HANDLING FILES

Enable/disable subsequent copy verification	**VERIFY ON/VERIFY OFF**
Copy a file from the default directory to a specific directory	**COPY** *FILENAME.EXT C:\DIR1*
Copy a file to the default directory	**COPY** *C:\DIR1\FILENAME.EXT*
Copy a file under a different name	**COPY** *C:\DIR1\FILENAME.EXT C:\DIR2\NEWNAME.EXT*
Compare a file with its copy	**COMP** *C:\DIR1\FILENAME.EXT C:\DIR2\NEWNAME.EXT*
Delete a file	**DEL** *C:\DIR1\FILENAME.EXT*
Rename a file without copying it	**REN** *C:\DIR1\FILENAME.EXT NEWNAME.EXT*
View the contents of a text file	**TYPE** *FILENAME.EXT*

Copying Groups of Files

Copy files and subdirectories under *DIR1*	**XCOPY** *C:\DIR1 D:\DIR2* **/S**
Copy files made on or after a date	**XCOPY** *C:\DIR1* **A: /D:08-22-91**
Have XCOPY ask yes/no for each file	**XCOPY** *C:\DIR1* **A: /P**
Duplicate a disk using two floppy drives	**DISKCOPY A: B:**

Fold Here

Duplicate a disk using same floppy drive	**DISKCOPY A: A:**

Note: VERIFY does not ensure an accurate copy. Always use COMP after COPY, and DISKCOMP after DISKCOPY.

MANAGING DISKS

Format a bootable floppy disk	**FORMAT A: /S**
Format a 360K floppy in a 1.2MB drive	**FORMAT A: /4**
Format a 720K floppy in a 1.44MB drive	**FORMAT B: /N:9 /T:80**
Back up drive C:'s files and subdirectories to drive A:	**BACKUP C:\ A: /S**
Back up a specific directory's WK1 files	**BACKUP** C:\DIR1***.WK1 A:**
Back up files modified since last backup	**BACKUP C:\ A: /M /S**
Restore backed-up files and subdirectories	**RESTORE A: C:\ /S**
Restore certain files to their original directory	**RESTORE A: C:*.WK1 /S**
Restore files modified since last backup	**RESTORE A: C: /M**

CHECKING AND CONFIGURING YOUR SYSTEM

Check the version of DOS	**VER**
Check or correct system time	**TIME**
Check or correct system date	**DATE**
Clear the screen	**CLS**
Check disk and memory usage	**CHKDSK**
Fix any file errors during a check	**CHKDSK /F**
Check a particular file	**CHKDSK** *FILENAME.EXT*

PC WORLD

Instant Reference Card #15

For use with PC World Instant Reference Card Portfolio

ADVANCED: DOS 5.0

How it works: DOS 5.0 provides several command line and memory management commands not present in other versions. You issue them like other commands, either from the DOS prompt or as lines in CONFIG.SYS or AUTOEXEC.BAT files. Two of them, DOSSHELL and EDIT, launch menu-driven programs.

UNDELETE AND UNFORMAT

These two commands undo other commands issued in error. Although they restore recently deleted files ond recently formotted disks, there's no guarantee they can retrieve something once you've performed other operotions on o disk.

Restore any deleted files in DIR1	**UNDELETE** *C:\DIR1*
Restore oll files without confirmation	**UNDELETE** *C:\DIR1* **/ALL**
List deleted files without restoring	**UNDELETE** *C:\DIR1* **/LIST**
Restore files on a formatted disk	**UNFORMAT A:**
List files without restoring	**UNFORMAT A: /TEST**

Notes: If you format a disk using the /U switch (e.g., FORMAT A: /U), you cannot restore it using UNDELETE. Also, these instructions assume that UNDELETE.EXE and UNFORMAT.COM are in a directory listed in the most recently executed PATH commond.

OPTIMIZING MEMORY USAGE

Install high memory driver	Add **DEVICE=\DOS\HIMEM.SYS** to beginning of CONFIG.SYS file
Load DOS into extended memory	Add **DOS=HIGH** to CONFIG.SYS file; requires HIMEM.SYS
Use 640K of extended memory to emulate expanded	Add **DEVICE=\DOS\EMM386.EXE 640** to CONFIG.SYS file; requires 386/486 processor and HIMEM.SYS
Use 512K of extended memory for disk caching	Add **DEVICE=\DOS\SMARTDRV.SYS 512** to CONFIG.SYS after HIMEM.SYS
Use 512K of extended memory os o RAM disk	Add **DEVICE=\DOS\RAMDRIVE.SYS 512 /e** to CONFIG.SYS after HIMEM.SYS
Instoll Ramdrive in upper memory	Add **DEVICEHIGH=\DOS\RAMDRIVE.SYS 512 /a** to CONFIG.SYS after HIMEM.SYS
Load DOSKEY in upper memory	Add **LOADHIGH \DOS\DOSKEY.COM** to AUTOEXEC.BAT; requires HIMEM.SYS
Check memory usage	**MEM**

Note: These instructions assume that HIMEM.SYS, EMM386.EXE, SMARTDRV.SYS, RAMDRIVE.SYS, and DOSKEY.COM are in a directory called \DOS on the boot drive.

Fold Here

USING THE DOS SHELL

The shell program has three basic windows: o directory tree of the selected disk, a file listing for the live directory, and o moin DOS command window.

Open o menu	**<Alt>** and first letter of menu nome, or click with mouse
Select a command from a menu	Open menu, type highlighted letter, or click with mouse
Get help	Choose **H**elp or press **<F1>**
Select a different drive	Use cursor keys or click with mouse
Toggle between windows	**<Tab>** or click with mouse
Select severol consecutive files	Highlight first file, hold down **<Shift>**, move to last file nome
Select nonconsecutive files	Hold down **<Ctrl>** while clicking on file names, or highlight first file, **<Shift>-<F8>**, use cursor keys and **<Space>** bar to select files, **<Shift>-<F8>**
Delete selected files	Press **<Delete>**
Move selected files	Press **<F7>**
Copy selected files	Press **<F8>**
View contents	Press **<F9>**

EDITING DOS COMMANDS WITH DOSKEY

The DOSKEY command opens a buffer to store the commands you issue from the DOS prompt for you to reuse or edit.

Disploy previous/next command	**<Cursor Up>/<Cursor Down>**
Move one chorocter left/right	**<Cursor Left>/<Cursor Right>**
Move to beginning/end of commond	**<Home>/<End>**
Move one word left/right	**<Ctrl>-<Cursor Left>/<Ctrl>-<Cursor Right>**
Delete characters to beginning/end	**<Ctrl>-<Home>/<Ctrl>-<End>**
Delete entire commond	**<Esc>**
Toggle insert/overtype	**<Insert>**
Disploy all commands in buffer	**<F7>**
Display starting with character(s)	*character(s)***<F8>**
Display *n*th command	**<F9>***n*
Display first/last command in buffer	**<Page Up>/<Page Down>**

EDITING FILES WITH EDIT

DOS 5.0's EDIT is a character editor for text files that works with a mouse or the keyboard.

Start EDIT to edit *filenome*	**EDIT** *filename*
Open o menu	**<Alt>** and first letter of menu name, or click on menu name
Select a command from a menu	Open menu, type highlighted letter or click on command, or press shortcut keys
Get help	Choose **H**elp or press **<F1>**
Move one character/line at a time	**<Cursor Left>**, **<Cursor Right>**/**<Cursor Up>**, **<Cursor Down>**
Move one word left/right	**<Ctrl>-<Cursor Left>/<Ctrl>-<Cursor Right>**
Move to beginning/end of line	**<Home>/<End>**
Scroll up/down one screen	**<Page Up>/<Page Down>**
Move to beginning/end of file	**<Ctrl>-<Home>/<Ctrl>-<End>**
Select text	Move to beginning of text, hold down **<Shift>** and highlight with cursor keys, or press mouse button and drag across text
Move text	Select text, choose **F**ile **C**ut or press **<Shift>-<Delete>**, move to new location, choose **F**ile **P**aste or press **<Shift>-<Insert>**
Copy text	Select text, choose **F**ile **C**opy or press **<Ctrl>-<Insert>**, move to new locotion, choose **F**ile **P**oste or press **<Shift>-<Insert>**
Delete text	Select text, choose **F**ile **C**lear or press **<Delete>**
Find text	Choose **S**earch **F**ind, type text to find
Reploce text	Choose **S**earch **R**eplace, type text to replace, **<Tab>**, type replacement text
Print a file	Choose **F**ile **P**rint
Save a file	Choose **F**ile **S**ave, type file name

Fold Here

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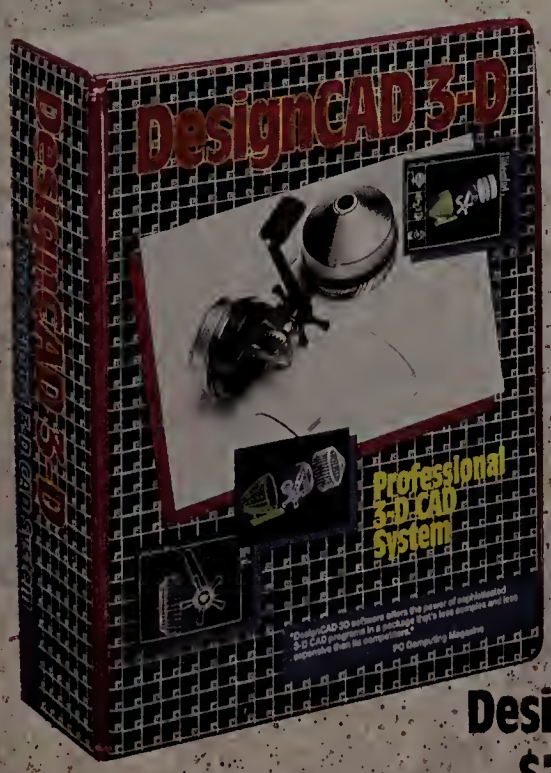

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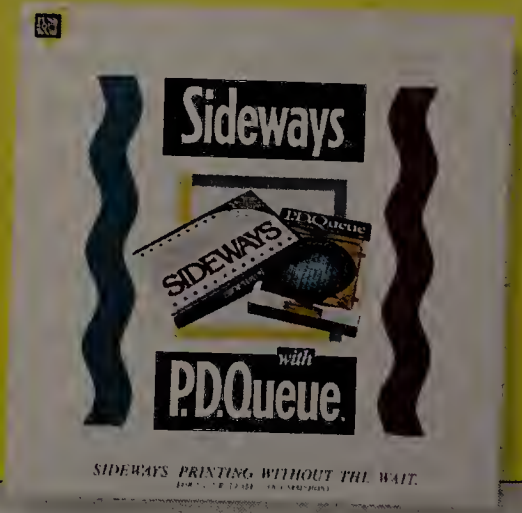

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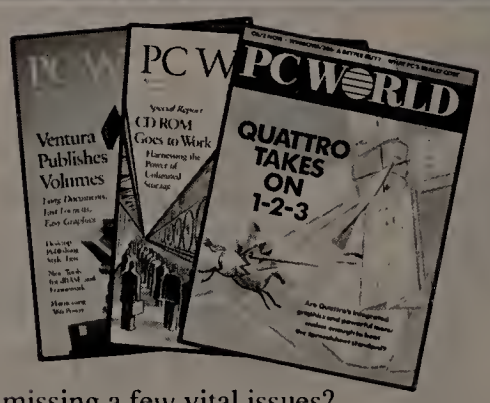

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Editor's note: You can make this trick even easier by placing the formula that might produce an error in a cell that's outside the range of what you see and print. For instance, if you put the formula that does the calculation in, say, AK12, you can use the formula **@IF(@ISERR(AK12)," ",AK12)**. *This approach has two advantages: First, the math isn't done twice; second, you can edit the formula once—rather than twice—if it needs to be changed.*

Brett Glass is a contributing editor for PC World.

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POWER TIP NO. 199

Easily Navigate Windows Subdirectories

Windows 2.xx's crude MS-DOS Executive has one saving grace: With it, you can quickly move up to a parent directory by pressing <Backspace>. With *Windows 3.0*, you can do the same thing in the File Manager and in file-oriented dialog boxes by repeatedly clicking the [..] at the top of the directory list. Depending on the complexity of your disk's directory structure, no more than three or four clicks should put you in the root directory. From there, you can find anything quickly.

Richard Mann
Roy, Utah

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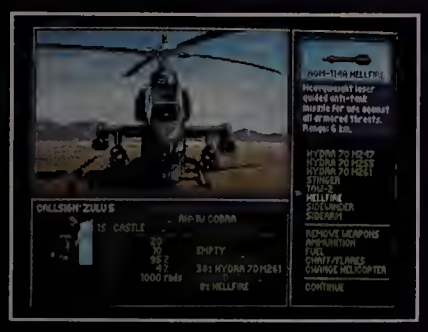

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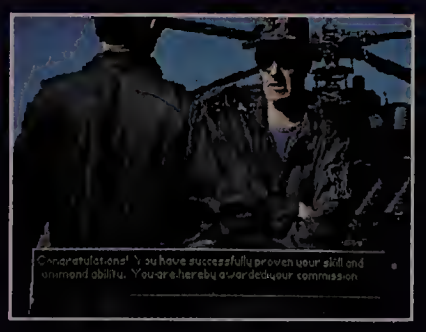

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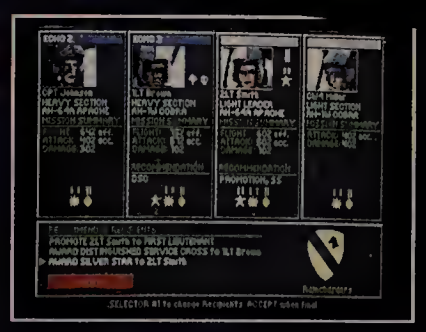

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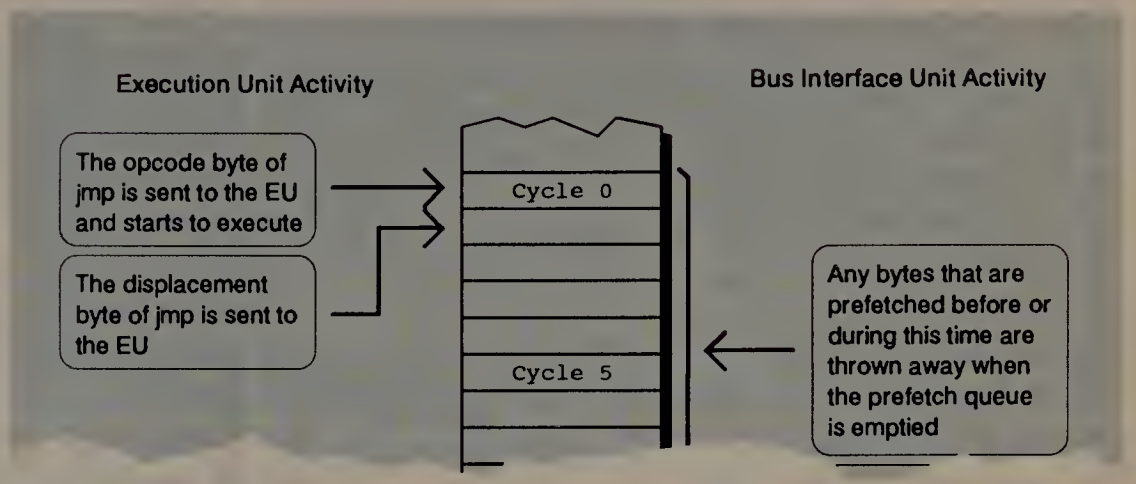

A figure from "Zen of Assembly Language" shows how you can speed a program by fetching one instruction while another is executing.

The tools of the programmer's trade include more than just software and hardware; every codesmith needs a good library of reference books on languages, operating systems, data structures, algorithms, and program-building techniques. *Zen of Assembly Language* and *Undocumented DOS* are two books that belong on every PC programmer's bookshelf.

Michael Abrash's work, *Zen of Assembly Language Volume I, Knowledge,* starts off with the assumption that you are at least somewhat familiar with 80x86 assembly language programming, and it doesn't bother with explaining basics such as registers or addresses. Instead, it helps you to write superb, rather than merely adequate, assembly language code.

Abrash first introduces a set of routines for taking precise measurements of your program's execution time. He then delves into the secrets of the PC's architecture, showing why code that *seems* to be efficient on paper may not be in the real world. There are chapters on "cycle eaters" (hardware pitfalls that slow down programs), efficient (and inefficient) memory addressing modes, jump instructions, and optimizing for the more advanced 386 and 486 processors.

Zen was originally intended as the first of two or three books on advanced assembly programming. At this date, however, only one volume is out, and no others are on the drawing board. This is a pity; Abrash's examples and advice are eminently practical, and his keen senses of humor and irony make the book fun as well as instructive. Why "Zen"? Says Abrash, "Zen is a technique that brings intuition and nonobvious approaches to bear on difficult problems and puzzles." Highly recommended.

Undocumented DOS is an excellent text for anyone who's curious about the innards of MS-DOS, and a must for anyone who writes TSRs, network redirectors, or other programs that work with DOS internals. Written by half a dozen knowledgeable authors, including editor Andrew Schulman, *Undocumented DOS* covers "the body of functions and data structures that can reasonably be considered part of DOS, yet are either unmentioned in the documentation or marked 'Reserved.'"

The first two chapters discuss the reasons for, and logistics of, using undocumented DOS features. The next few chapters cover DOS's data structures and contain fascinating and enlightening discussions of the way DOS allocates resources, uses files, and connects to networks and non-DOS file systems (such as CD ROM drives). If you wish to do advanced memory management, add a new kind of storage device, or create a network driver for DOS, this information will help you do the job right.

Subsequent sections cover features that let you write TSRs, command interpreters, and debuggers. The last chapter gives you a script-driven, event-driven debugger—in a combination of C and assembly—that shows you how DOS and its utility programs access undocumented features.

Undocumented DOS is a collaborative work that draws on years of collective experience and experimentation as well as on hundreds of pages of on-line discussion. Before this book was published, the only way to gather this information was to disassemble DOS yourself. Now, at last, programmers can spend less time reinventing the wheel and more time producing useful products.

Have a favorite programming tool you'd like to see discussed here? Send suggestions to my Internet E-mail address, rogue@well.sf.ca.us, reachable via CompuServe, MCI Mail, Internet, and Usenet.

WHERE TO BUY

Zen of Assembly Language Volume I, Knowledge
Michael Abrash
Scott, Foresman and Company
Glenview, IL
1990, $29.95
ISBN: 0-673-38602-3

Undocumented DOS
Andrew Schulman, Raymond J. Michels, Jim Kyle, Tim Paterson, David Maxey, Ralf Brown
Addison-Wesley Publishing Co., Inc.
Reading, MA
1990, $39.95 (disks included)
ISBN: 0-201-57064-5

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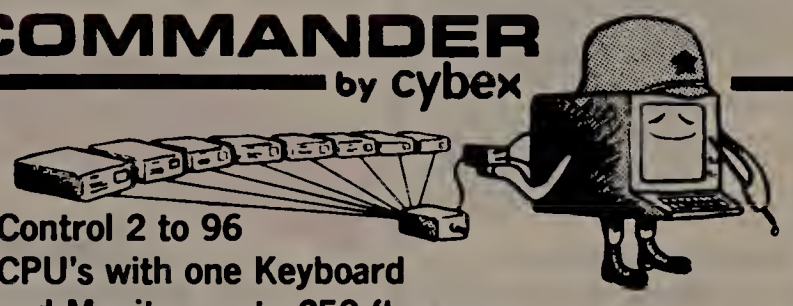

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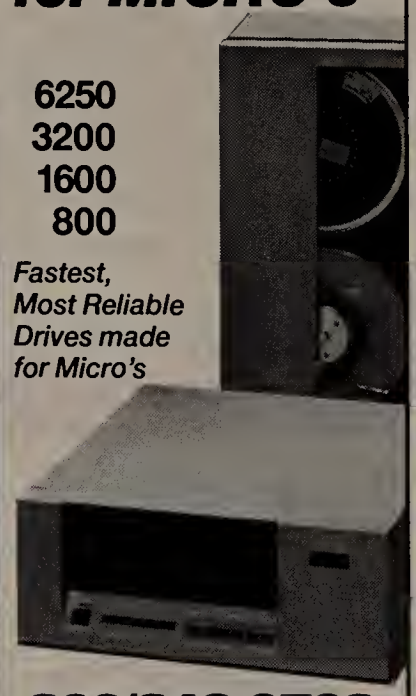

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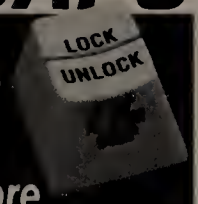

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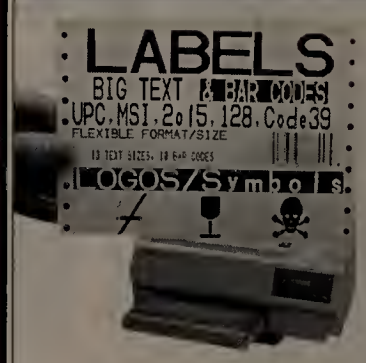

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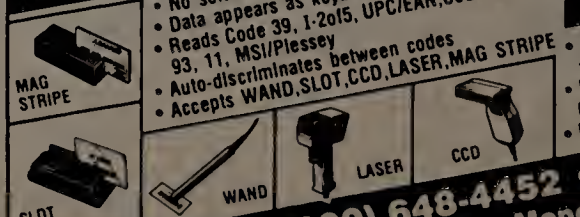

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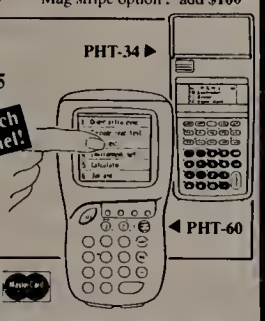

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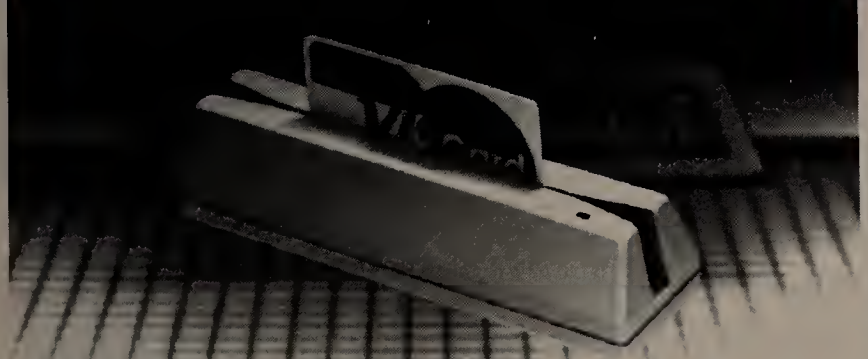

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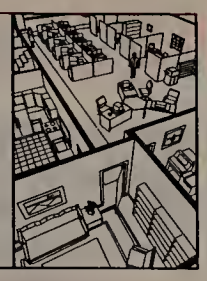

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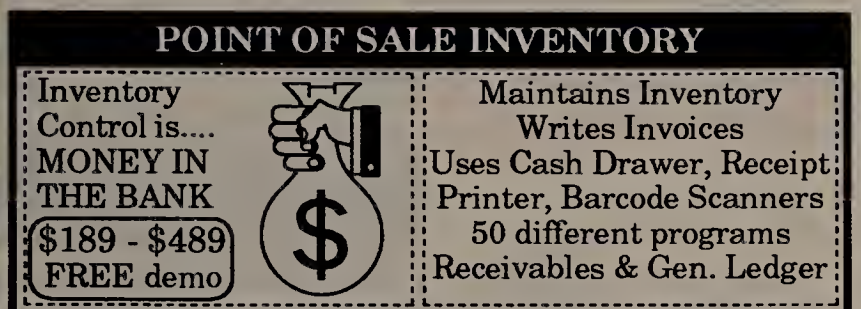

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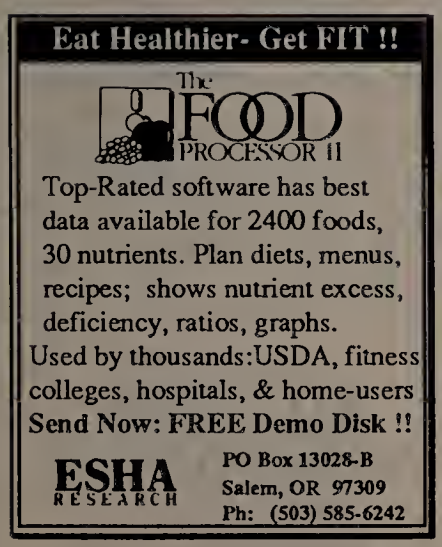

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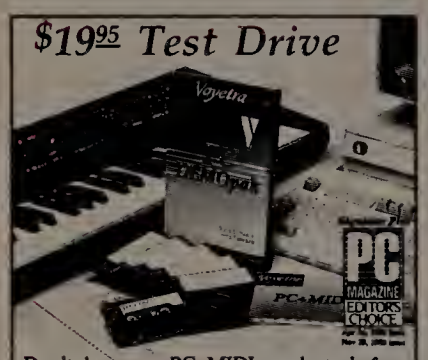

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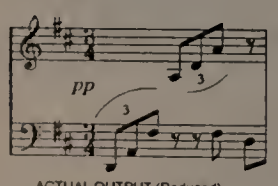

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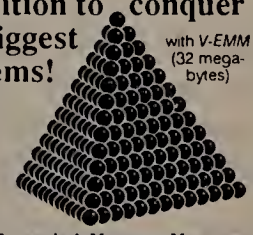

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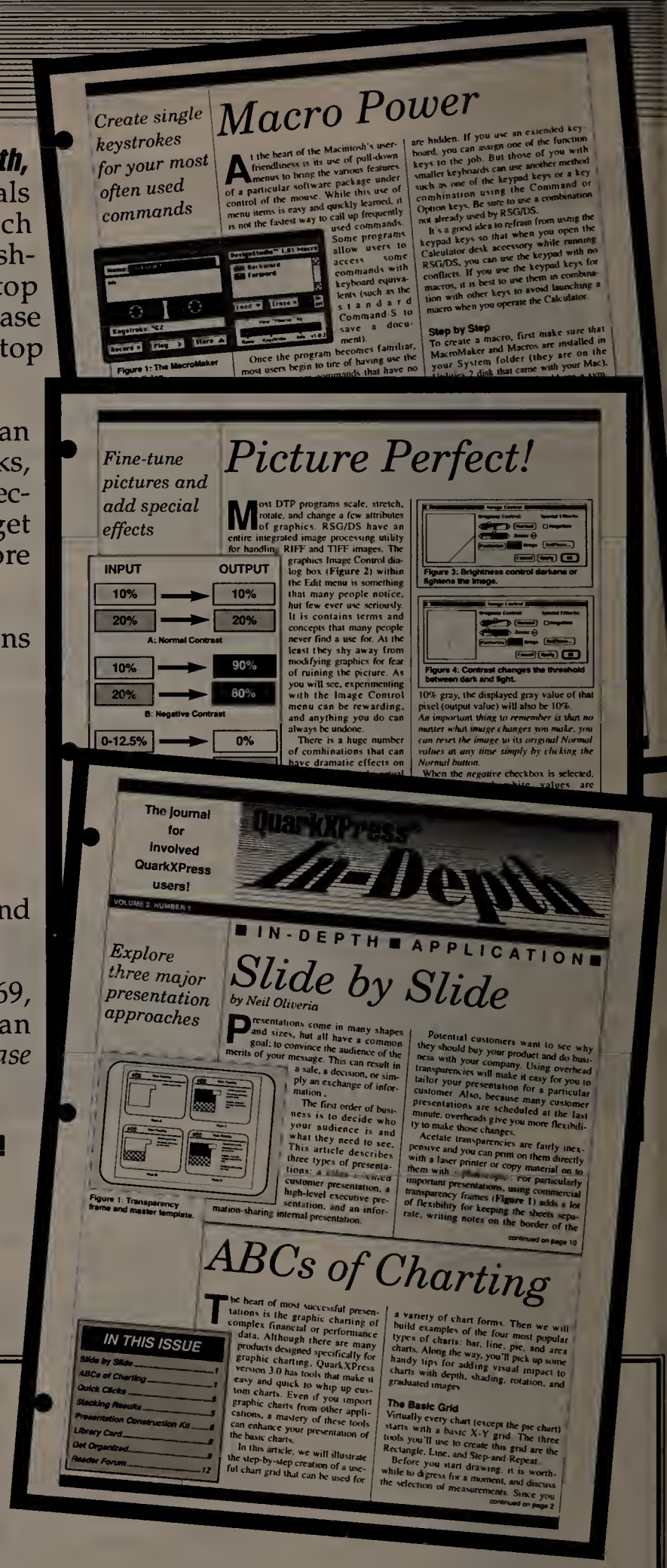

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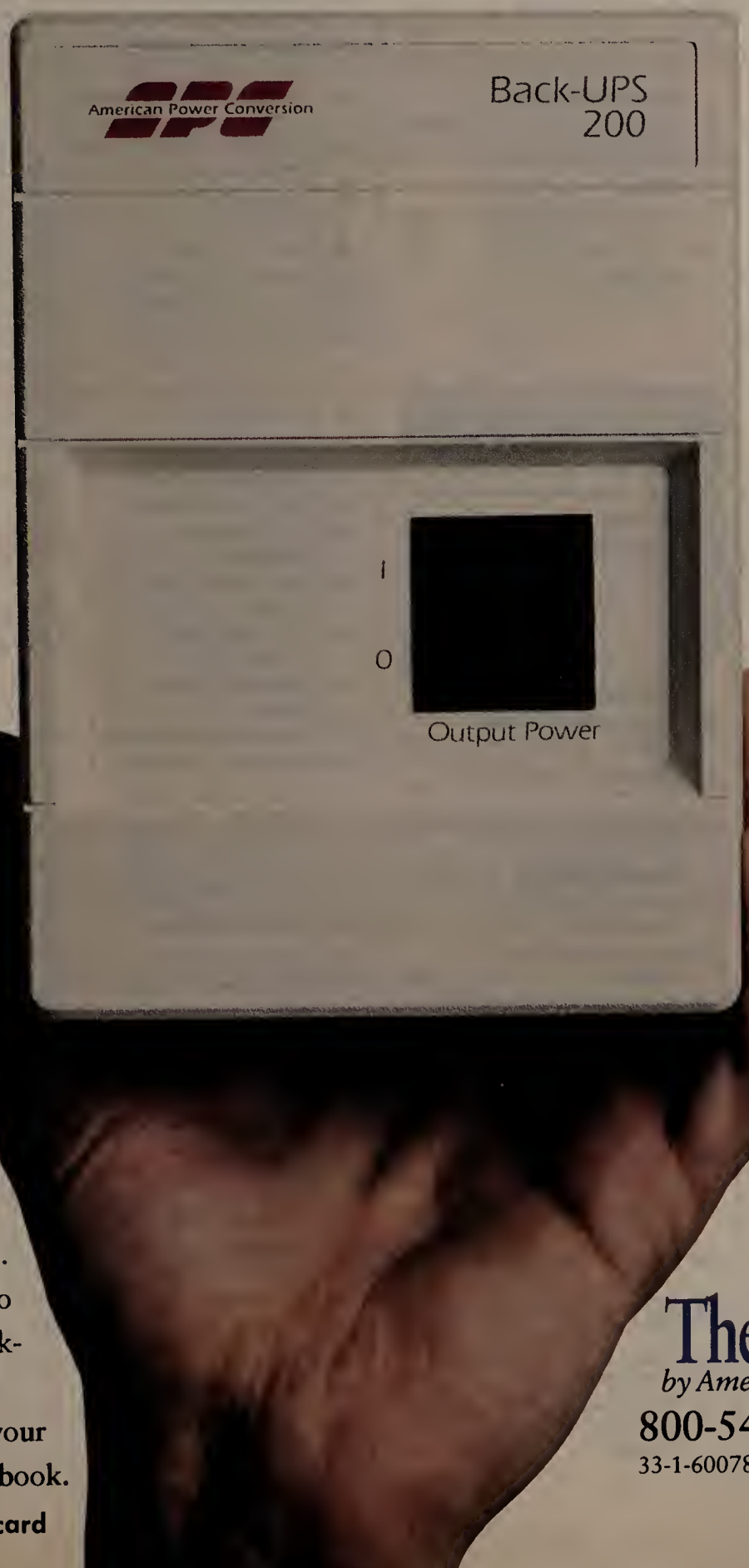

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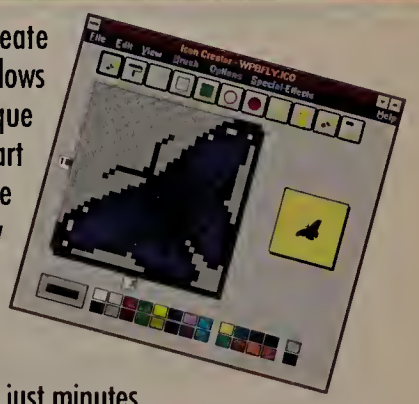

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☐**PrintPartner (2 disks) (3260) -** PrintMaster/PrintShop clone that prints banners, signs and more. Includes 200+ graphics.

CLIP ART (PCX)

Note: These disks contain clip art in PCX (PC-Paintbrush) format. They can be used with WordPerfect 5.0/5.1, Pagemaker, Ventura Publisher, Windows or programs that can read PCX files.

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Shareware programs require separate payment to the authors if found useful.

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☐**CGA Tetris Collection (1895) -** Five great variations of the popular game. (CGA)
☐**Ed's Chess/PowerChess/Chess Tutor (2425) -** Two very good games and a superb tutorial. (CGA)
☐**Kids' Games (2317) -** Fun for the under 12 set.
☐**Super Solitaire (2 disks) (2460) -** 15 great versions. (CGA)

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Note: These games require EGA or VGA graphics.

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- ✓ 200 watt power supply
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- ✓ Clock calendar, parallel port, two serial ports, and game port.
- ✓ Keytronics 101 key keyboard.
- ✓ 8 expansion slots, 5 drive bays.
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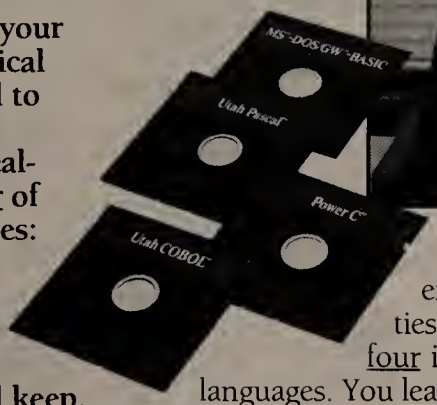

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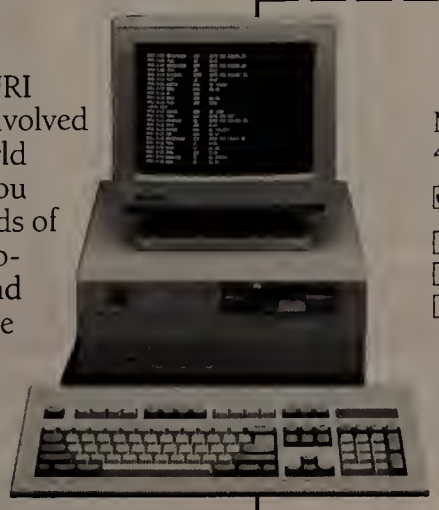

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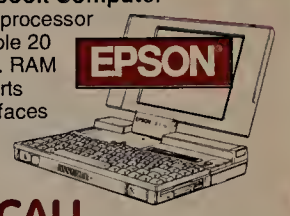

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MICROTEK COLOR SCANNERS

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600G for PC & PS/2 ..... $1099

Logitech Scanman 256 w/OCR (Special)

Hand-held, 256 gray levels. Bundled w/ Ansel software (Windows 3.0 compatible) and Catchword OCR software. While Supplies last $295

Niscan GS for Windows 3.0

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ProScan PS-3000 by OBM

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PS-1000 grayscale scanner with Picture Publisher and interface $399

Scanning Software & OCR

OCR (Optical Character Recognition)

Calera WordScan / WordScan Plus	$399 / 665
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Laser & Inkjet Printers

CANON

BJ-10e bubblejet printer 360x360 max res	$379
BJ-300 80 column 360 x 360 max resolution	495
BJ-330 11" x 17" 360x360 max resolution	689
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LBP-8T laser printer	1999
LBP-8R laser printer	2299

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OL820 (8-ppm, 300-dpi, 26 scalable fonts, 512-KB)	1355
OL840 (8-ppm, 300-dpi, PostScript, 35 fonts, 2-MB)	1995

PANASONIC

KX-P4420 (300-dpi, HP LJ emulation, 8-ppm)	$795
KX-P4450i (300-dpi, HP LJ emulation, 11-ppm)	1195
KX-P4455 (300-dpi, 35-fonts, PostScript, 11-ppm)	1995

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NEC

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QMS

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LOGITECH

MouseMan serial (left handed or right handed mice)	$75
MouseMan bus	79
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ST251-1 (MFM)	42MB 28ms hh	238
ST157A (IDE)	44MB 28ms 3.5"	205
ST1102A (IDE)	84MB 20ms hh	319
ST1144A (IDE)	125MB 20ms hh	415
ST1239A (IDE)	211MB 15ms 3.5"	699
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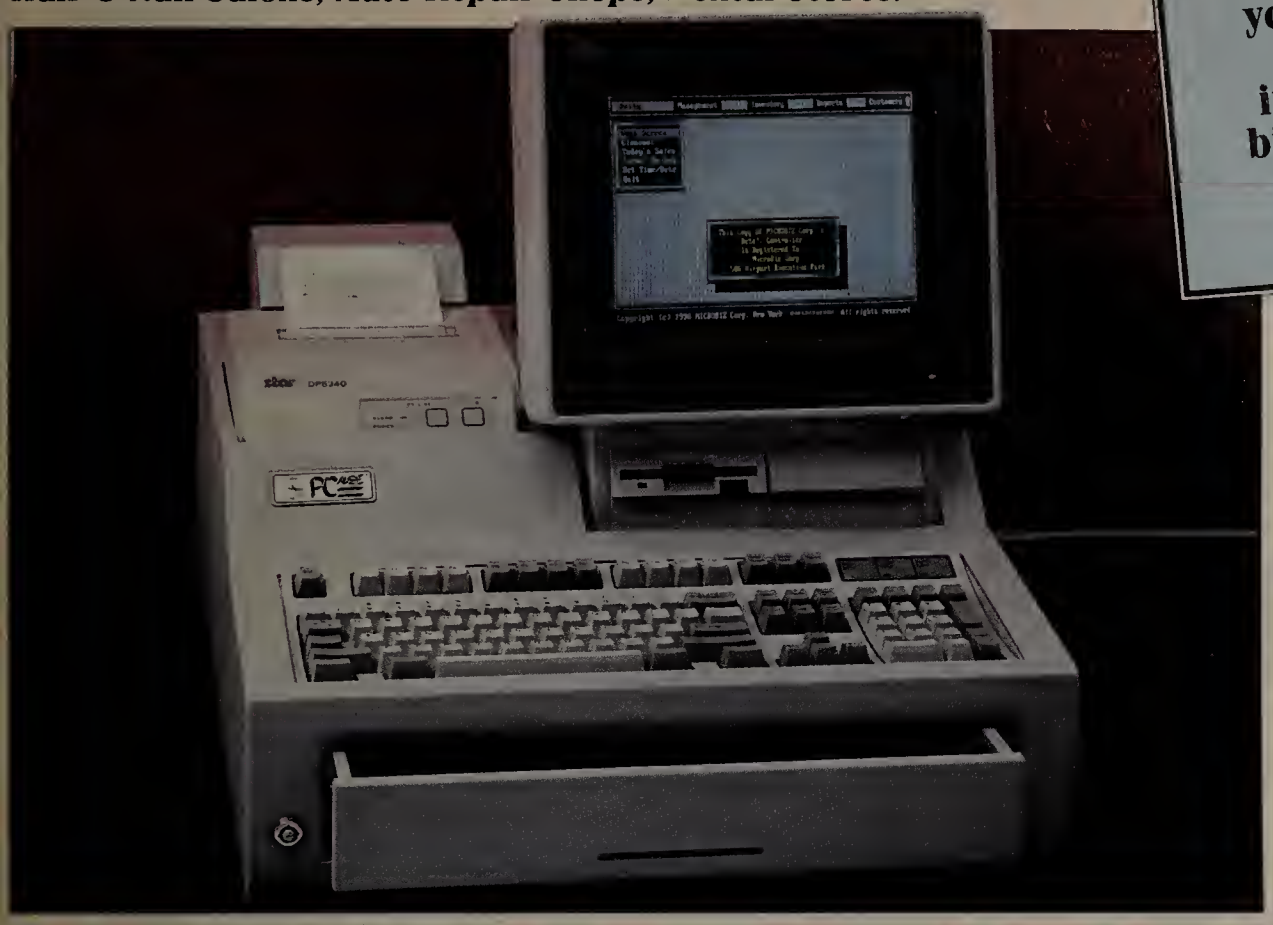

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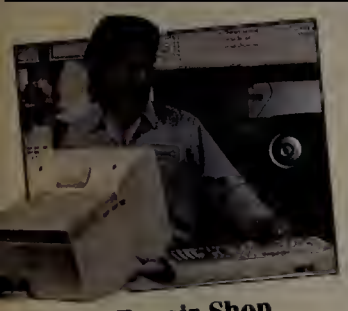

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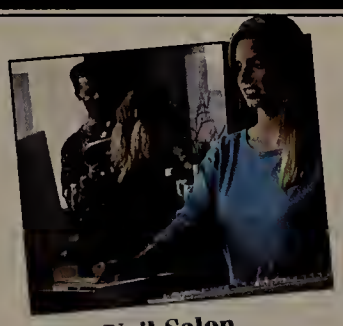

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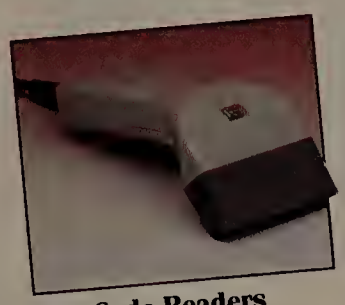

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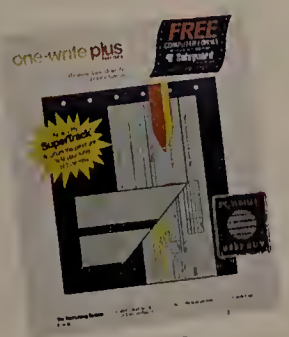

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THE HOME OFFICE

The practical guide to home/office computing

Get the overalls, Honey, I'm doing it myself

Steve Bass

The old saying "The heart is willing, but the palms are sweaty" is only half true. My heart was pounding as well. I had decided to repair my old 286 clunker and discovered I could save almost $500 by replacing the system board myself instead of taking it in for service. So I wiped the sweat from my palms and went at it.

Despite my early trepidation about venturing into unfamiliar territory, I discovered PC "repair" to be relatively straightforward. It took me only 4 hours —much of it spent fiddling with my CONFIG.SYS and AUTOEXEC.BAT files. I learned plenty about my computer, chose the system board *I* wanted, and even impressed my wife. And let's not forget I saved a few bucks.

I figured as long as I was popping the hood, I might as well install a faster engine. I wanted enough speed and memory to run *Windows* easily. After comparing the specifications of more than 20 different 386 boards, I decided on AMI's 386/486 Mark III Convertible because while I can only afford the 33-MHz 386DX version right now, I can upgrade with a 486 processor card later.

The Mark III with 4MB lists for $1475, but nobody ever pays list price. You can get one for about $1200.

On the day of reckoning, I cleared the desk, turned on the answering machine, and opened my copy of Aubrey Pilgram's *Build Your Own 80486 PC and Save a Bundle.*

If you're doing it yourself, there are some precautions you *must* take. First, the obvious but most important: Unplug the computer before you take off the case. Controlling electrostatic discharge is essential. If you don't, you risk frying the system board or other components. I wore a $3.79 antistatic wristband from Radio Shack. I also used Curtis's Touch Me First antistatic pad.

You'll need small Phillips and flat-blade screwdrivers plus a pair of needle-nose pliers. Tiny screws invariably drop from your fingers and hide under the floppy drive, so have a small flashlight handy and a pencil with a bead of Silly Putty at the point. I used one of those plastic boxes with all the compartments to hold the multitude of screws and system board brackets.

LINDA BLECK

My anxiety peaked as I began working my way down to my old motherboard. There were dozens of wires and cables snaking from here to Taiwan. To avoid confusion, I had sketched out a diagram of both motherboard assemblies *before* removing anything.

As I removed each add-in card, I noted where it came from on the old computer diagram and where it would go on the new one. I used masking tape and a felt pen to mark each wire and flat cable with a number, recording what it was connected to and the direction of the connector's pins. Ditto for the power supply, floppy drives, battery, speaker, reset button, and other components. If you can, leave the floppy and hard drives in their cages with the cables attached.

Two last screws, and the system board slid out. I removed the white plastic brackets, used them with the new system board, and reversed the entire procedure. After some minor tweaking with the SETUP program, I rebooted and—by golly, it worked.

While I'll never go into the repair business, I'm glad I took the risk. It was fun and, with the $480 or so I saved on parts markup and labor, I got a faster computer with lots more memory. ●

Contributing Editor Steve Bass is a family therapist and president of the Pasadena IBM Users Group.

Mark III $1475; American Megatrends, Inc.; 800/828-9264, 404/263-9381 (fax)
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3. If for resale, please identify your primary customers:
   ☐ General Business ☐ Government ☐ Education ☐ Medical
4. How many PCs does your company plan to purchase in the next twelve months?

Quantity	Timeframe	Quantity	Timeframe
_____	Less than 1 month	_____	6-12 months
_____	1-3 months	_____	More than 12 months
_____	3-6 months		

5. What do you plan to use computer products for?

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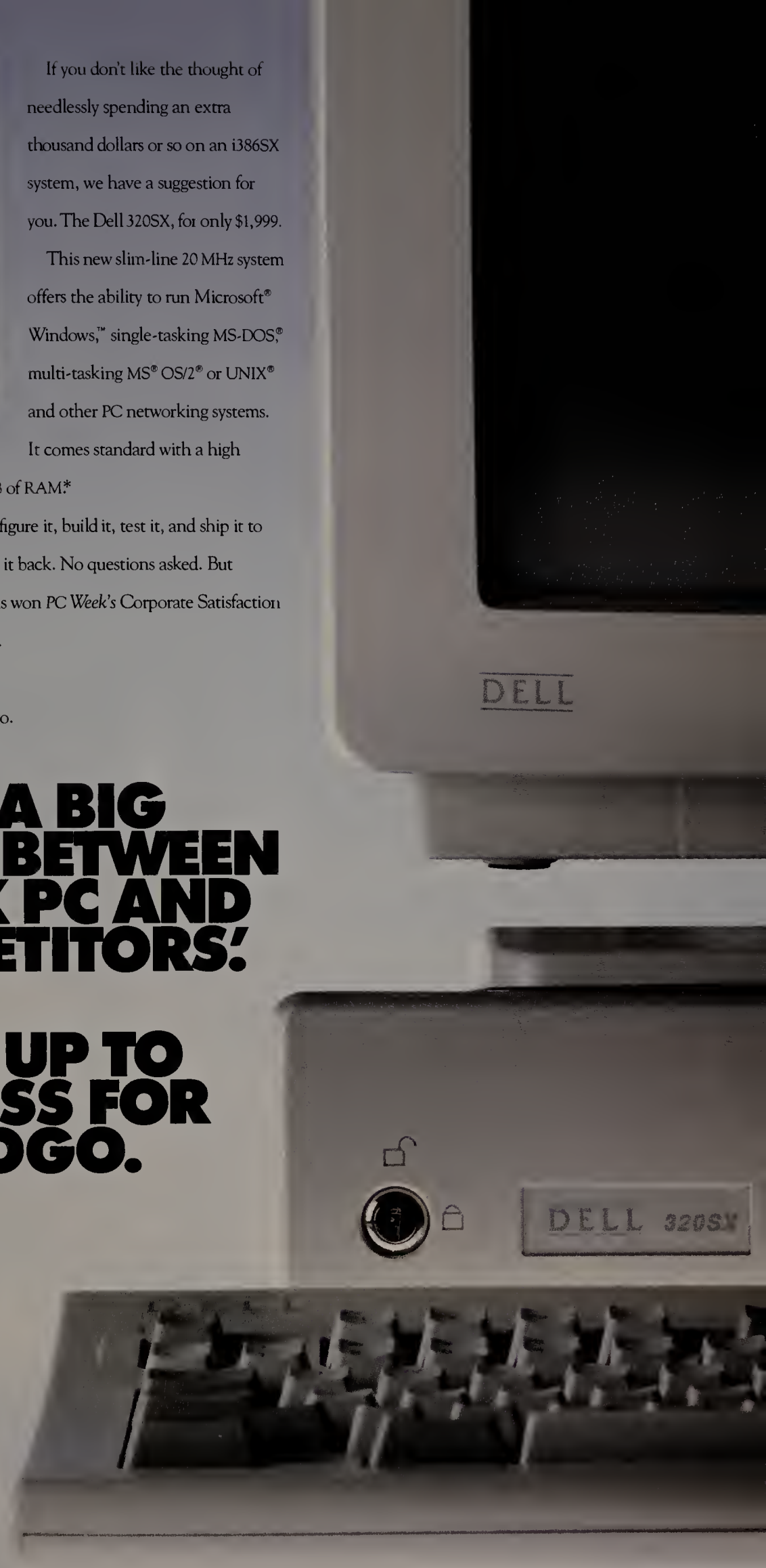

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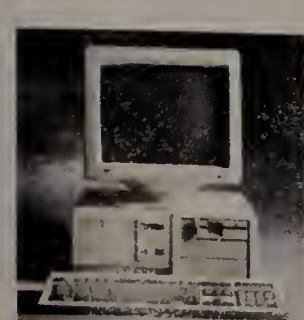

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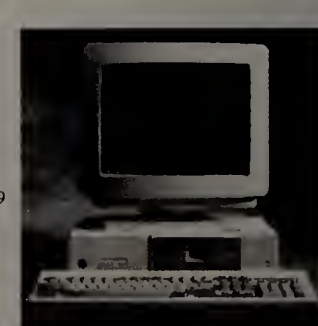

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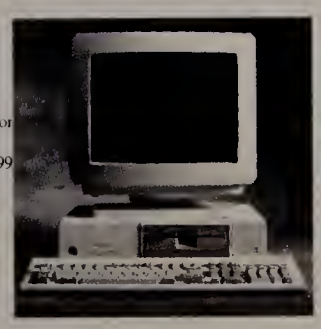

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